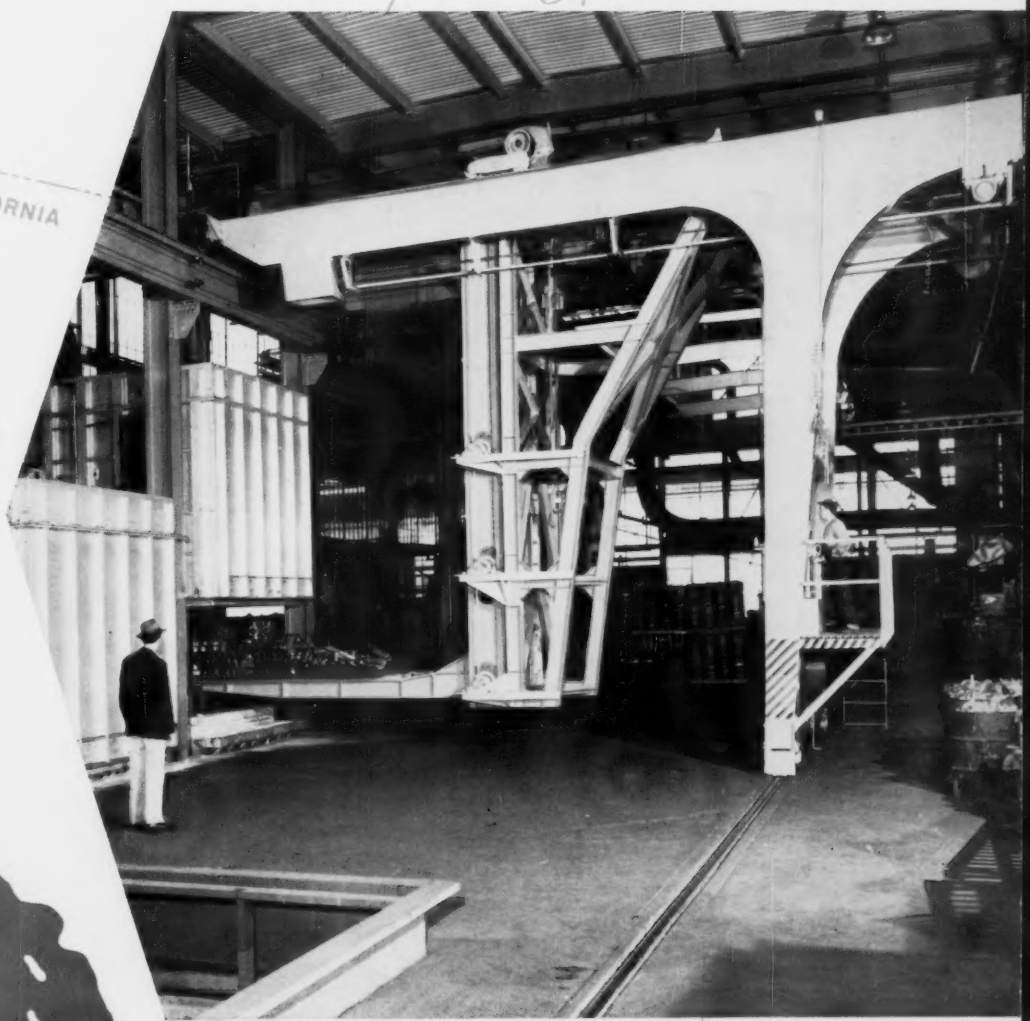
MARCH
1957

PENTON PUBLICATION

FOUNDRY



☆ How a Jobbing Foundry Can Be Mechanized

Flexibility of operation is keynote of new General Metals Corp. foundry... page 98

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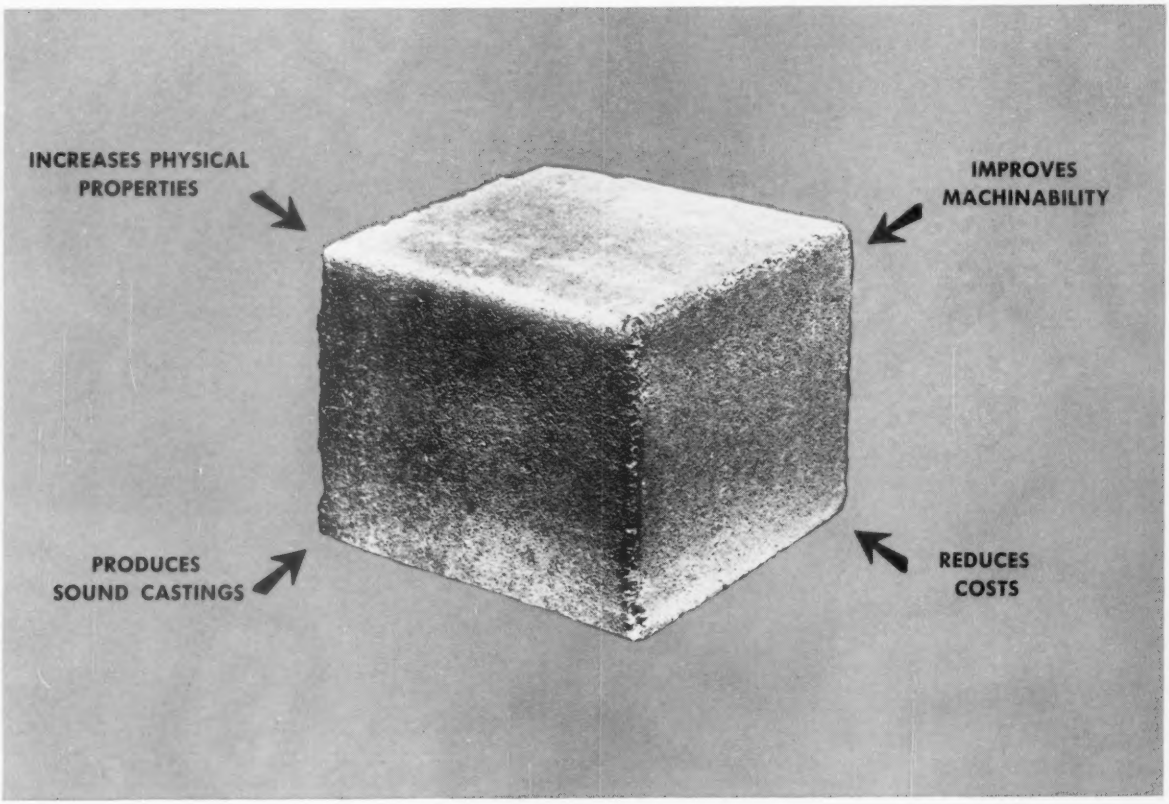
Q. How can you produce GRAY IRON CASTINGS to meet the Demand for Improved Quality?



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REGISTERED TRADE MARK

INCREASES PHYSICAL PROPERTIES—A more dispersed structure free of segregations, finer-grained, denser, stronger, greater wear and heat shock resistance.

PRODUCES SOUND CASTINGS—Iron deoxidized with FERROCARBO Briquettes is more fluid at casting temperatures; spiral fluidity molds show longer runs.

IMPROVES MACHINABILITY—In a survey of eleven leading foundries, FERROCARBO treated castings averaged 89.5% greater machinability per tool than untreated castings.

REDUCES COSTS—Additional Silicon recovery; permits use of cheaper scrap steel or cast iron in charge while giving your customer premium castings.

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THE CARBORUNDUM COMPANY

NIAGARA FALLS, NEW YORK

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B.F.Goodrich

3000-degrees hot but doors don't melt

A typical example of B. F. Goodrich improvement in rubber

THERE'S melted steel inside those big furnaces. Temperature is 3000 degrees. The heavy steel doors would melt in minutes except for that hose that carries a stream of cooling water in and out of them.

But hose was burning out in months or even weeks. It had to stand heat 24 hours a day, seven days a week, was often banged by big "charging machines," spattered with hot metal. Then B. F. Goodrich developed a new kind of hose made of wire, asbestos and rubber. It had been in use more than a year when the above picture was taken. It is less expensive than the hose used before, is much lighter and more flexible, easier for workmen to handle. One man can install it where two men were needed for other hose.

B. F. Goodrich has made hundreds of improvements in dozens of kinds of hose to make them last longer, cost less, save your time and money. Most improvements, while making the hose stand more abuse, have also made it more flexible and easier to handle. B. F. Goodrich makes hose to carry almost anything—air hose that stands sharp flying rocks outside and hot oil inside, burstproof steam hose that can't burst even if it wears out. hose that lasts for years carrying gasoline, paints, chemicals, even dry materials such as flour or cement.

Call your B. F. Goodrich distributor for more information about any kind of hose, belting or other rubber products. *B. F. Goodrich Industrial Products Company, Department M-881, Akron 18, Ohio.*

B.F.Goodrich

INDUSTRIAL PRODUCTS

Circle 554 on Inquiry Card—Page 225

Considering all the different kinds of sand additives on the market today—it's easy to understand how sand preparation might be quite a problem. But, here are just three additives that have been providing exactly the "right combination" for hundreds of foundries, all over the country. By adding them to sand in varying amounts, all the important sand characteristics can be closely controlled and changed at will, to satisfy specific requirements. They combine to provide more uniform mold hardness, better finish, better shakeout and more readily salable castings. And—common lake, river or beach sand can be used for replacement, without danger of grain size going out of balance. Finally, what's most important—*the cost of these three additives won't exceed $1.00 per ton of castings produced!*

Here's a quick run-down on the characteristics and capabilities of these FEDERAL sand additives:

CROWN HILL SEACOAL

For controlling carbon content. High in volatile, combustible material. Exceptionally low in sulphur content — which means your castings will have more easily-machined surfaces. Produced by FEDERAL at Crown Hill, West Virginia — ground or granulated to properly match the sand used.

FEDERAL GREEN BOND BENTONITE

The only pure, unadulterated, untreated bentonite — with *natural* low viscosity yet high green and dry compression strength. Cuts down on mulling time and permits slurry users to add 25% more bond (bentonite) per gallon of slurry, for strength desired, without strain on pumping system. Possesses many times the natural bonding power of any other sand bond. Truly the best of the bentonites! Mined in Wyoming and South Dakota, processed and guaranteed by FEDERAL.

FEDERAL SAND STABILIZER

For providing greater flowability and better shakeout. A processed cellulose sand additive whose high combustibility allows sand to expand evenly to eliminate casting defects. Increases sand flowability to permit green strength to be run higher, and to provide better ramming conditions. Attracts moisture to broaden the safe moisture range. Provides better, less lumpy shakeout, without adding other clays to sand mixtures.

It might be very helpful to investigate FEDERAL'S "right combination" — write today for your copy of our sand-preparation booklet—"Tailor-Made Molding Sands".

The FEDERAL FOUNDRY SUPPLY Company
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FOUNDRY

A PENTON PUBLICATION

March 1957

Volume 85—Number 3

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(For addresses of branch offices, see page 289)

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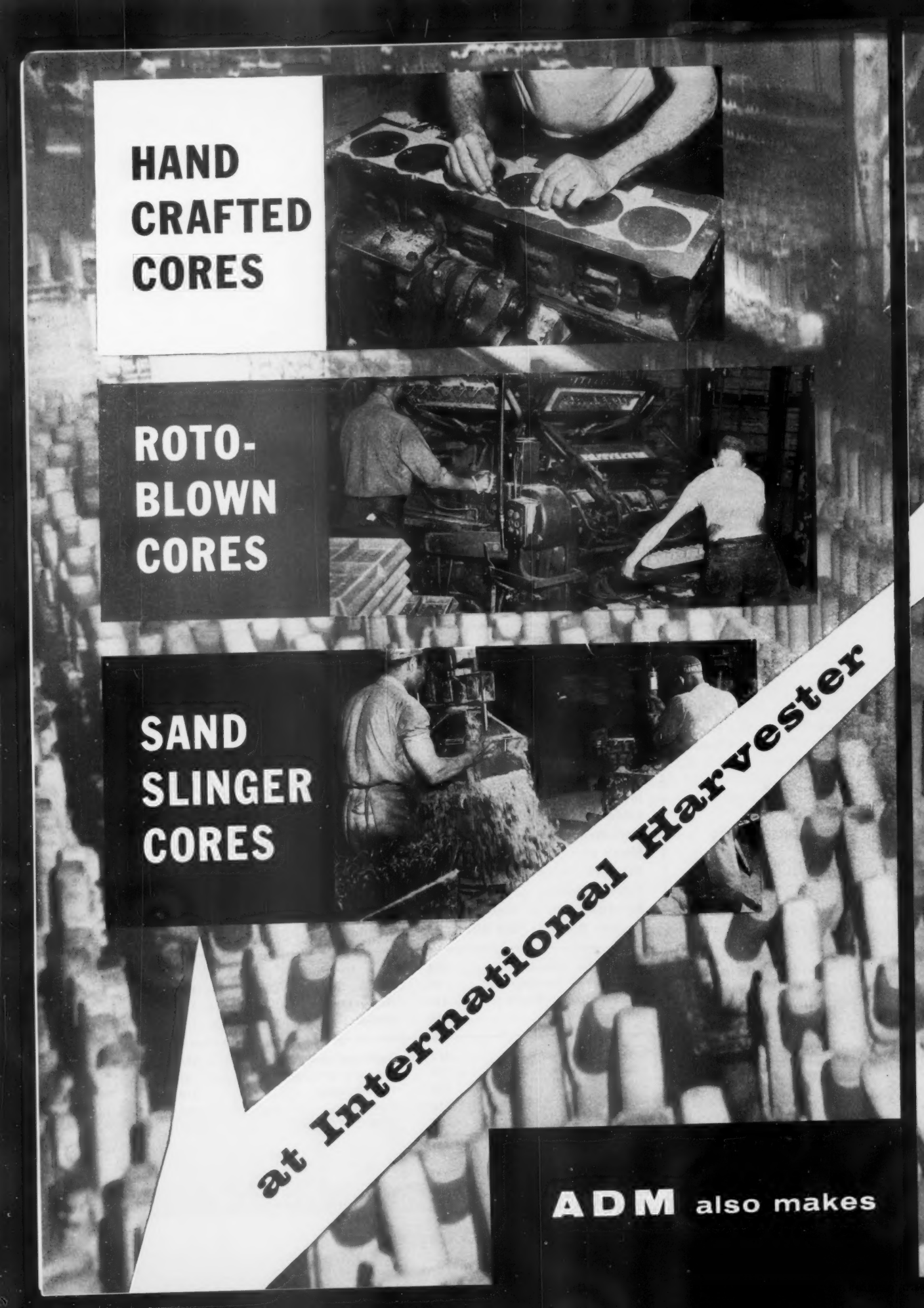
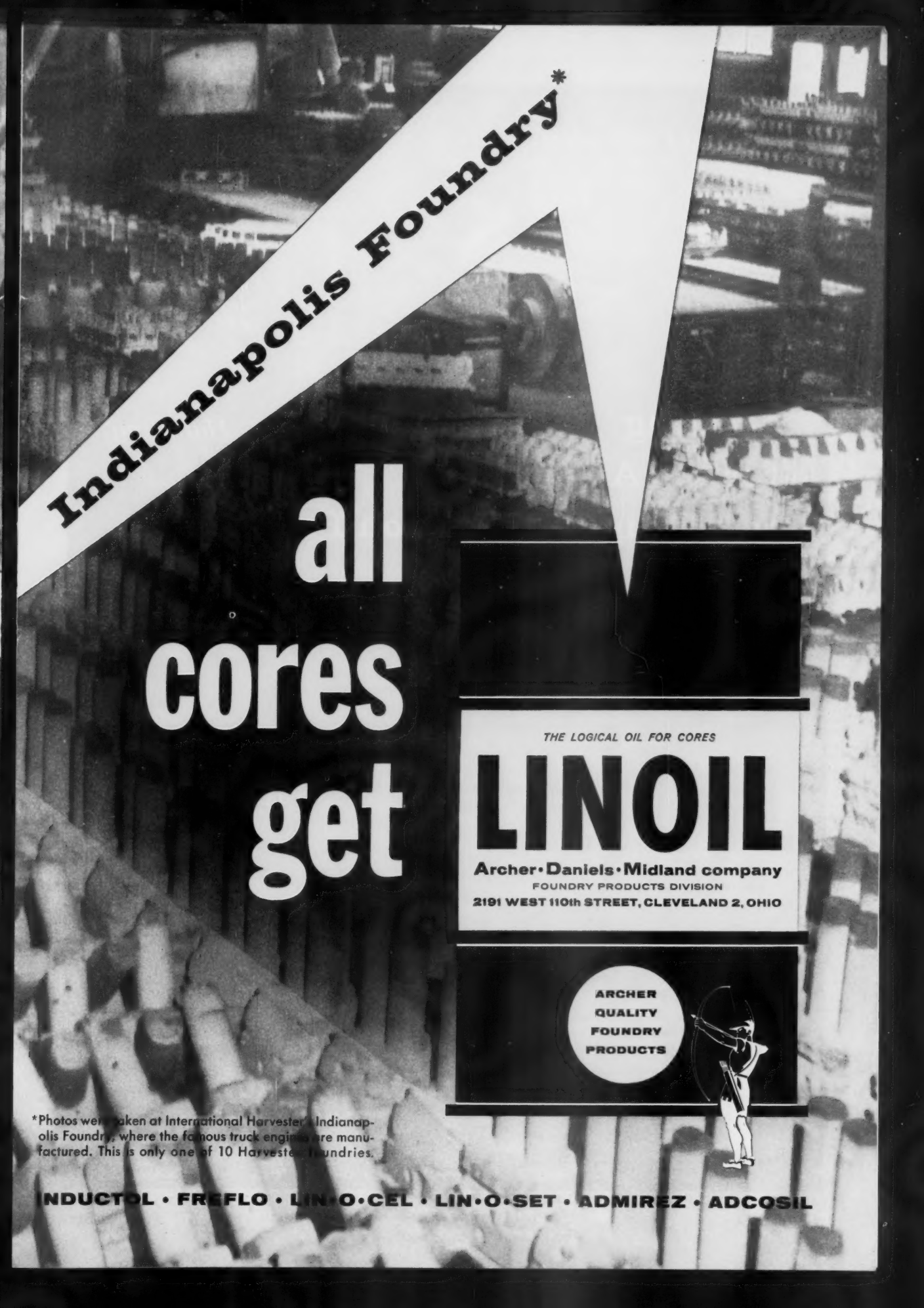

HAND CRAFTED CORES
ROTO-BLOWN CORES
SAND SLINGER CORES
at International Harvester
ADM also makes


Indianapolis Foundry*
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*Photos were taken at International Harvester's Indianapolis Foundry, where the famous truck engines are manufactured. This is only one of 10 Harvester foundries.
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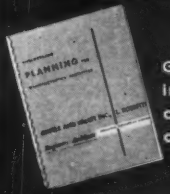
Special Processing?

Materials Handling?

Looking for the Answer to a Tough Production Problem...

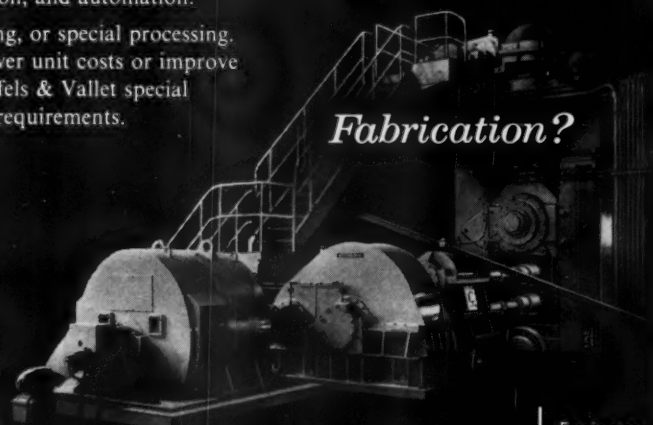
Frequently, the design of special machines will provide the answer. Helping management resolve production problems through the application of automated equipment is one of the important services offered by the Giffels & Vallet organization. This machine design service reflects years of extensive experience gained through the planning and engineering of production facilities for companies of widely diversified activity, in every area of industry. These practical insights have proved of great value in analyzing and applying solutions to problems involving special machines, mechanization, and automation.

Fabrication, assembly, materials handling, or special processing. Wherever you must increase output, lower unit costs or improve product quality—the application of Giffels & Vallet special machine design services will meet your requirements.

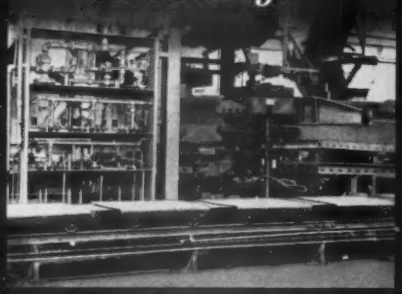


G & V services are discussed in a special Planning Brochure. A copy will be mailed on request.

Fabrication?



Assembly?



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Engineers Serving Industry for Over Thirty Years

Plant Layout • Process Development • Automation Engineering • Materials Handling • Machine Design • Building Design

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by Jantzen

nice to
look at....

nice to
work
with...

The finest
malleable
shot and
grit on
the market

METAL BLAST, INC.

872 EAST 67th STREET CLEVELAND 3, OHIO

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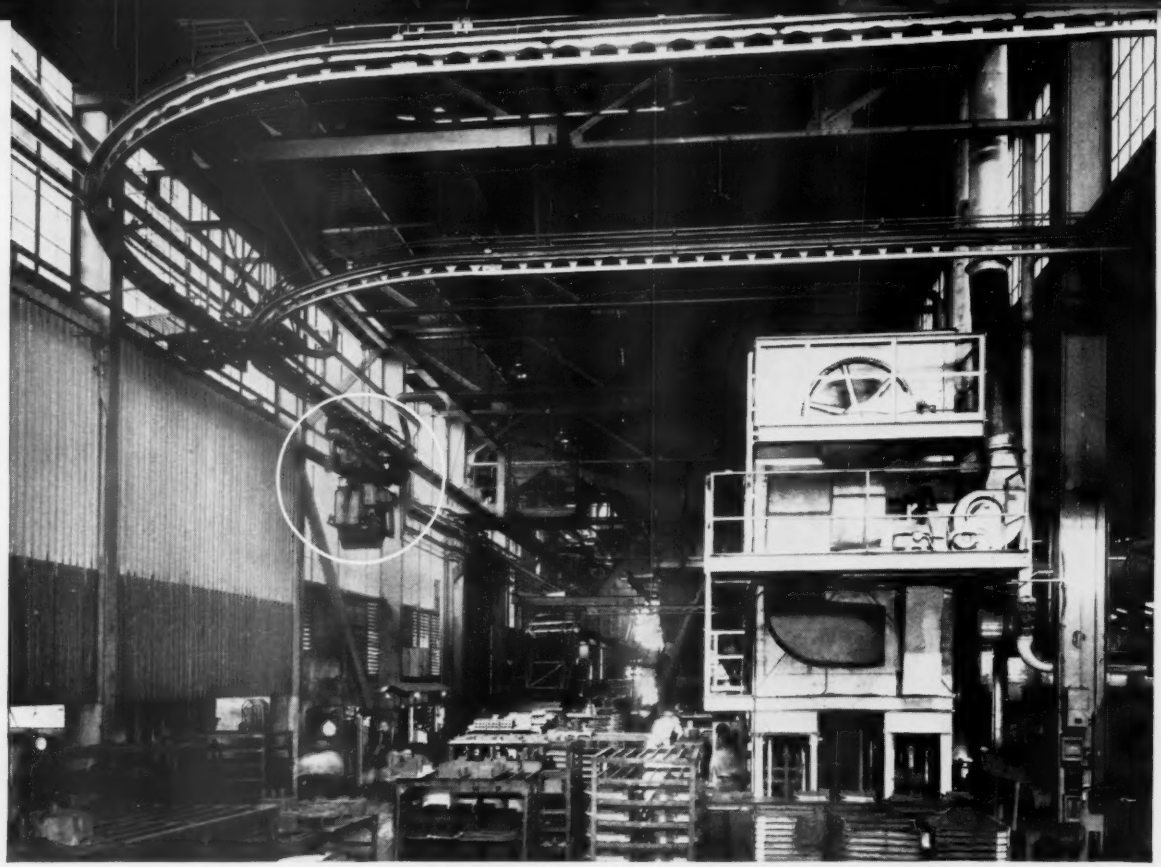


Automatic sand distribution system. Encircled is a bucket carrier with 2000 lbs. of molding sand enroute to one of 17 stations as preselected.

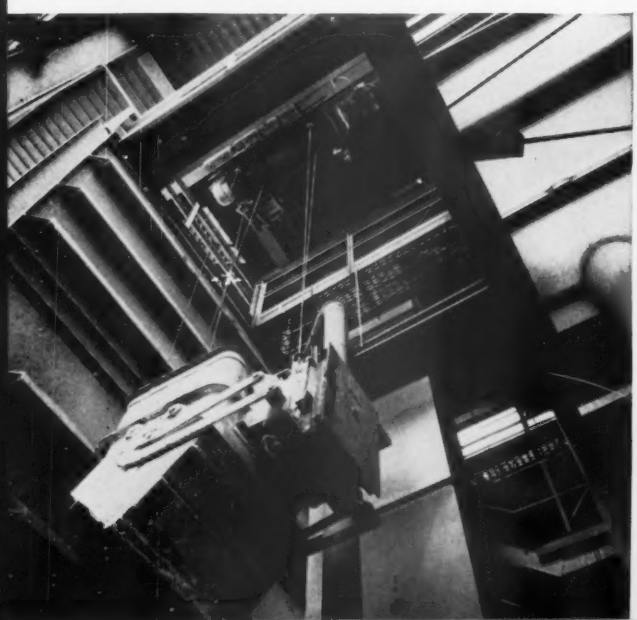
General Metals Blanketed

Extensive Overhead Installation Serves Nearly

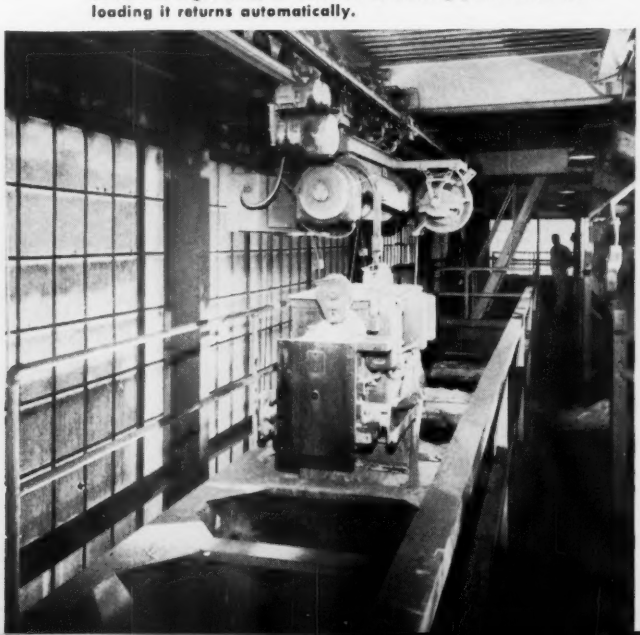
CLEVELAND Tramrail is proud of the important role it has been given by General Metals Corporation in their new foundry at Oakland, California. The new plant, which is reputed to have the most complete facilities in the West, is another outstanding addition to a list of more than 1000 Cleveland Tramrail-equipped foundries.

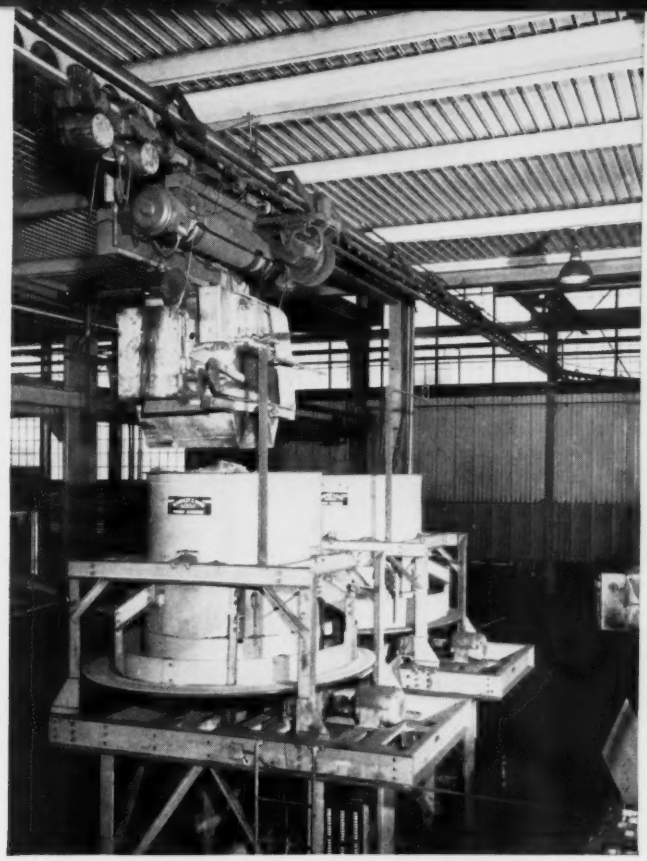
Nearly every department is served by Cleveland Tramrail. Both manually and electrically operated equipment in capacities from ½ to 10 tons are in operation. Wide use is made of transfer cranes. There are two automatic dispatch systems for core sand and blending materials. One delivers materials automatically to 17 stations. The illustrations

Automatic system lifting 2000 lb. bucket load of core sand blending materials to storage bins above.

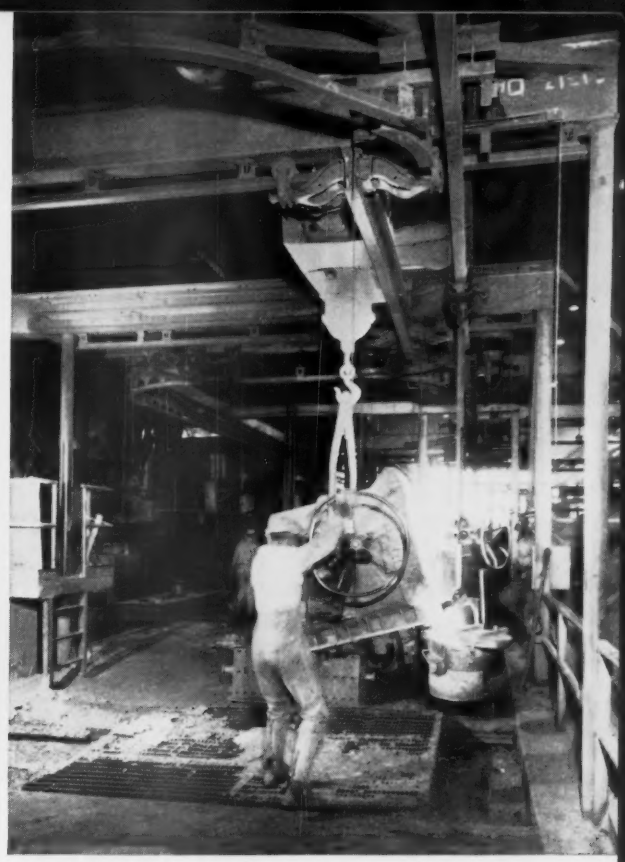


Here bucket has reached high position and carrier is unloading at one of eight bins, as selected at starting point. After unloading it returns automatically.





Automatic carrier dumping load of sand at station No. 16, which is supply for sand slinger. After unloading, carrier returns to the sand muller. Only attendant is man stationed at muller.



Transferring a bull ladle of hot metal from an electro melt furnace to a pouring ladle.

with Cleveland Tramrail

Every Materials Handling Requirement

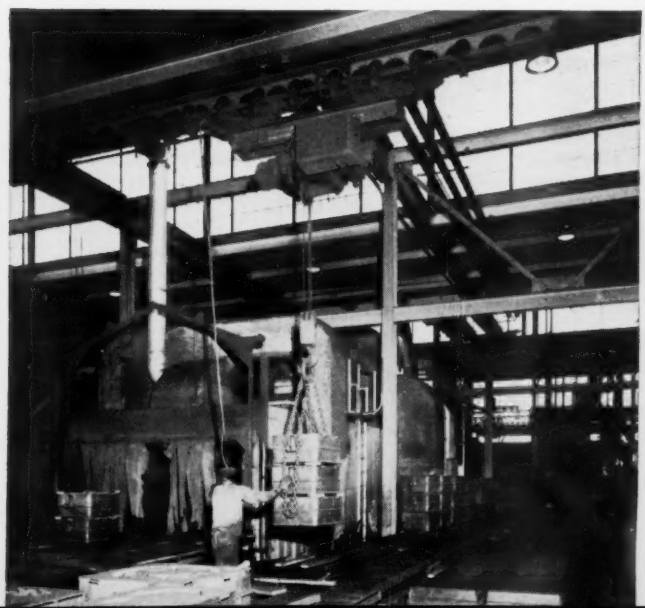
on these pages represent only a fraction of the entire Cleveland Tramrail installation.

For modern, efficient foundries like General Metals, where quality, performance and service are important to keep production costs low, the popular choice is Cleveland Tramrail.

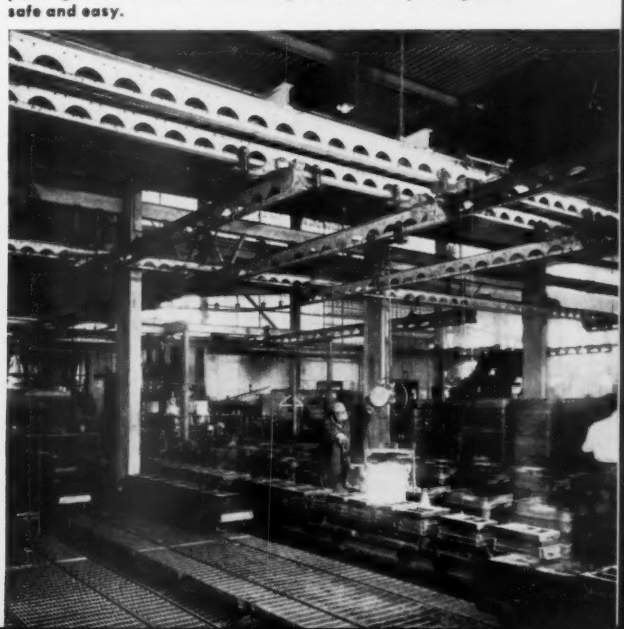
Write for free Engineering and Application Booklet No. 2008. Packed with valuable information.

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
3844 EAST 286TH ST. WICKLIFFE, OHIO.

10-ton Cleveland Tramrail crane handles large molds from drying oven to two mold conveyors.



An extensive interlocking crane system serves the light pouring floor. These smooth rolling cranes make pouring fast, safe and easy.



60 TONS

of hot castings daily

Every 16-hour day, 60 tons of castings with temperatures to 250° F. ride this Imperial Belt. The belt is Imperial* Standard Rexall—Impregnation 615 (117′ x 30″ x 5 ply)—a brand developed for the rugged requirements of this abrasive foundry service.

Long service life—Installed in 1953, this belt has been in continuous operation at the Chambers, Bering, Quinlan Co., a jobbing foundry. The characteristics that contribute to such long belt life include:

Super-strong construction . . . heavy-duty hard silver duck fabric.

Exclusive Imperial impregnation . . . waterproofs, lubricates, toughens and preserves every fiber.

Double stitching . . . permanently prevents ply separation.

Lowest year-to-year cost—Other Imperial INNERLOCKED* Belts are job-designed to withstand temperatures as high as 600° F. Their low operating cost has been proved over the last 45 years. ***Write for our new conveyor and elevator belting catalog and engineering handbook.***

**Reg. trademark of Imperial Belting Co.*

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BELTING COMPANY
1755 S. Kilbourn Ave., Chicago 23, Illinois
You expect MORE from Imperial . . . and you get MORE!

Circle 560 on Inquiry Card—Page 225

With the Editors

CHANGING STYLES: This is the beautiful office that houses key supervisory personnel and the staff of the chemical and physical laboratories at the Oakland, Calif. plant of General Metals Corp. It represents quite a change in the style of offices housing foundry personnel a quarter century ago. The building is located in the center of the U formed by a

new gray iron and malleable foundry, and a steel foundry built during World War II and is handy to all operations.

A complete description of this interesting show place of the foundry industry on the West Coast starts on page 98 of this issue.

—o—

Recruitment of Engineers: Jack Miske, associate editor, has been interviewing a number of foundrymen who have had success in recruiting young engineering graduates for their organizations. From the wealth of material plowed up, Jack has prepared an interesting and valuable article on recruitment problems as they pertain to foundries. This will be presented as the lead article in the April issue.

The foundry industry gets more complicated each year. More machine operations, greater attention to quality, and more exacting demands by customers point to the growing need for engineers in the production of castings. Whether or not you have decided that engineers are needed in your organization, you should read this article. It will not be long until you probably will make that decision and it is good to know about procedures in satisfying the need.

—o—

Mutual Interests: After looking at some of the recent exhibitions of foundry equipment, foundrymen have thought that designers and producers of the machines used in foundries should use more castings as replacements for components produced by other methods of fabrication. Equipment people have listened to these criticisms and have given reasons for present use of materials. Both sides have good arguments. Therefore, I was particularly interested in the following editorial by Donald H. Workman, executive vice president, Gray Iron Founders' Society, presented in the February issue of *Gray Iron News:*

ARE YOU BEING OUTSOLD?

Every other year when foundry equipment is exhibited at AFS Shows, we hear foundrymen grumbling that much of it now is a collection of steel shapes welded together for sale to the *foundry* trade. We have shared this feeling until recently.

Not too long ago a prominent industry spokesman gave us an eye-opening clue to this dilemma. He told us "maybe you foundrymen have been *outsold* in the equipment industry—and for the same reasons you have been outsold in *other* industries!"

He pointed out too that in this instance we are losing some castings business to friendly prospects who depend on foundrymen for most of their sales. So—if we can't sell our *friends* on merit—we'd better find out why.

The easy way out might seem to be to ask the foundry equipment people to use castings "or else," but our spokesman counters that this kind of talk would be quite short-sighted. Instead, as suggested above, we must look at the reasons why we haven't sold them—and then see if the same reasons might apply to other lost markets. Simple reciprocity with our equipment friends could breed complacency—and as our far-sighted speaker says, "complacency is the death of many businesses!"

Foundries must sell the merits of their products—and if the merits don't sell it, the foundryman must have the courage to go back and develop merits that *will* sell.

Foundry equipment manufacturers want to help us make a better product more efficiently and less costly, but in the long run it would be a great unkindness to us if they bought *our* products on anything but merit.

We substantially agree that apparently we have been *outsold* in some foundry equipment—but we reserve the right to our opinion that in a number of specific applications the equipment people may well have been *oversold* on other forms of fabrication. Wherever a casting is better we must tell our story and *sell* it. This applies to *all* markets for gray iron castings.

—o—

Builders Should Listen: Resentment to the terrible slaughter on our highways seems to be developing. Motorists may expect stronger laws and more rigid enforcement in an effort to cut the deaths.

Comment in the press provides a more critical attitude toward the automobile and its manufacturers. This is well illustrated in an editorial in the Suffolk County *News*, Sayville, Long Island, N. Y., and reproduced recently in a Cleveland newspaper:

YOU'LL DIE IN COMFORT

We have taken a long, low look at the new automobile models and have come to the conclusion that the driver of the 1957 car will pay more to kill himself. But he will die in luxury.

If all the horsepower under the streamlined hood sends him to his death against a telephone pole he will have the satisfaction of knowing that the last few moments of his life were spent in the most attractive automobile ever built.

Most manufacturers continue to disregard pleas from safety groups that frills in design be eliminated and safety features substituted but the public doesn't seem to mind. The

BAKER announces an ALL NEW PNEUMATIC-TIRED FORK TRUCK

Trail Axle
Double-yoke construction for extra strength. Longitudinal mounting in jumbo rubber blocks to provide lateral oscillation and absorb ground shocks.

Power Unit
Heavy-duty industrial gas engine with extra stamina for continuous rugged service. Features maximum fuel economy—minimum maintenance.

Power Steering
Standard at no extra cost. Effortless full-time power steering means less operator fatigue, greater safety and more work per day.

Lift and Tilt Controls
Conveniently located and easily manipulated levers for positive control of hydraulically-operated hoist and tilt motions.

Drive Axle & Transmission
Rugged Timken industrial truck axle and heavy-duty transmission, with two speeds, forward and reverse.

Single or Dual Wheels
Large pneumatic tires on drive wheels, with deep treads for maximum traction. Dual wheels available for extra heavy duty, better flotation and added stability.

Brakes—Hydraulic self-energizing, full-floating type—in drive wheels. Self energizing in both forward and reverse. Duo-grip, two-shoe independent parking brake on transmission shaft.

This Baker FGF-40, 4,000-lb. YARDLOADER, first in the new line of Baker pneumatic-tired gas fork trucks, has many new design features for greater maneuverability and more dependable performance. It is *fast*—top speed with load, 8.6 mph. It is *compact*—only 48 inch wheelbase, and minimum overhang—*and only 79 inch turning radius.* Low center of gravity makes this possible without sacrificing stability.

Absense of cowl provides maximum visibility. Power steering and many other driver conveniences make it one of the easiest handling fork trucks—and one of the safest. Full 130-inch lift, with single or dual cylinder. Truck-loading mast available with 110-inch lift and 71-inch overall height . . . For complete information ask for Bulletin 1382.

Baker® industrial trucks

THE BAKER-RAULANG COMPANY
1223 WEST 80th STREET • CLEVELAND 2, OHIO
A Subsidiary of Otis Elevator Company

Otis 7G1

Circle 561 on Inquiry Card—Page 225

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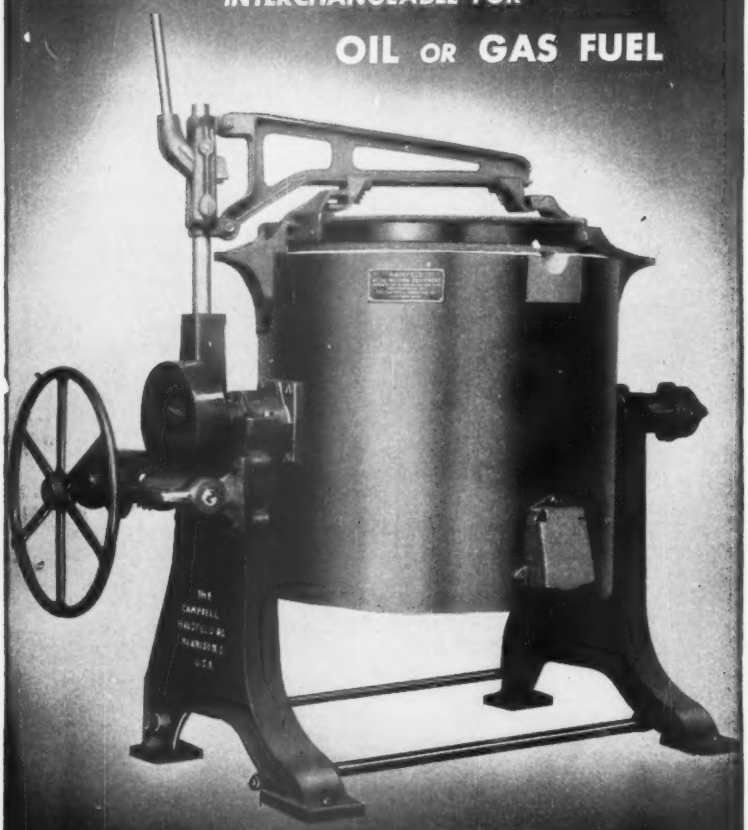
A FURNACE FOR EVERY NON-FERROUS MELTING REQUIREMENT

INTERCHANGEABLE FOR

OIL OR GAS FUEL



Built for Service

The Campbell-Hausfeld Co.

300-320 MOORE ST. HARRISON, OHIO

average car now challenges death with upswept rear fenders, with rocket engines, and with bodies constructed of streamlined metal that bends under the pressure of one's hand.

The new cars will provide more money for the manufacturers, a comfortable living for the dealer, a thrill for the driver, and more business for the undertaker. They will require the services of more plastic surgeons, doctors skilled in mending fractures, of trained ambulance attendants and nurses. They will keep police highway patrols on their toes. Cemetery diggers will get more business.

Also auto towing services and wreckers will benefit. The junk dealers will find business better than ever, all thanks to the ingenuity of the automobile designers, the business sense of the manufacturers and the skilled phrases of the advertising agencies.

Had they combined their skills to produce a reasonably priced vehicle which would carry human beings from one place to another in comfort and safety they would be forcing their customers to save their own lives. This might develop into an unprofitable and unpopular trend. The idea today is to kill yourself in luxury. If you must bleed to death, do it on highly polished chrome and two-toned slip covers.

Style, power and speed may be better sales arguments than safety to most buyers. But in the long run, something must be done in this matter of safe design and construction.

—o—

Promotion Possibility: The steel industry, through the American Iron and Steel Institute, has published a new edition of the 72-page booklet "Charting Steel's Progress—A Graphic Facts Book on the Iron and Steel Industry." Information is presented on raw materials, capacity of the industry, the nation's steel production, shipments of finished steel products, wages and working conditions, and financial data. The publication is given wide distribution.

A similar but less pretentious book on the foundry industry surely would help promote that basic industry. Too bad that funds are not available to undertake this promotion project.

—o—

Popular Journalism: Instead of doodling (which might have been more profitable) during an exceptionally dry meeting, one of our younger editors dreamed up a number of possible titles for articles which, in his opinion, would make each issue of the old family journal a collector's item. His list includes some down-to-earth examples of the present editorial trends in some of our popular (?) magazines.

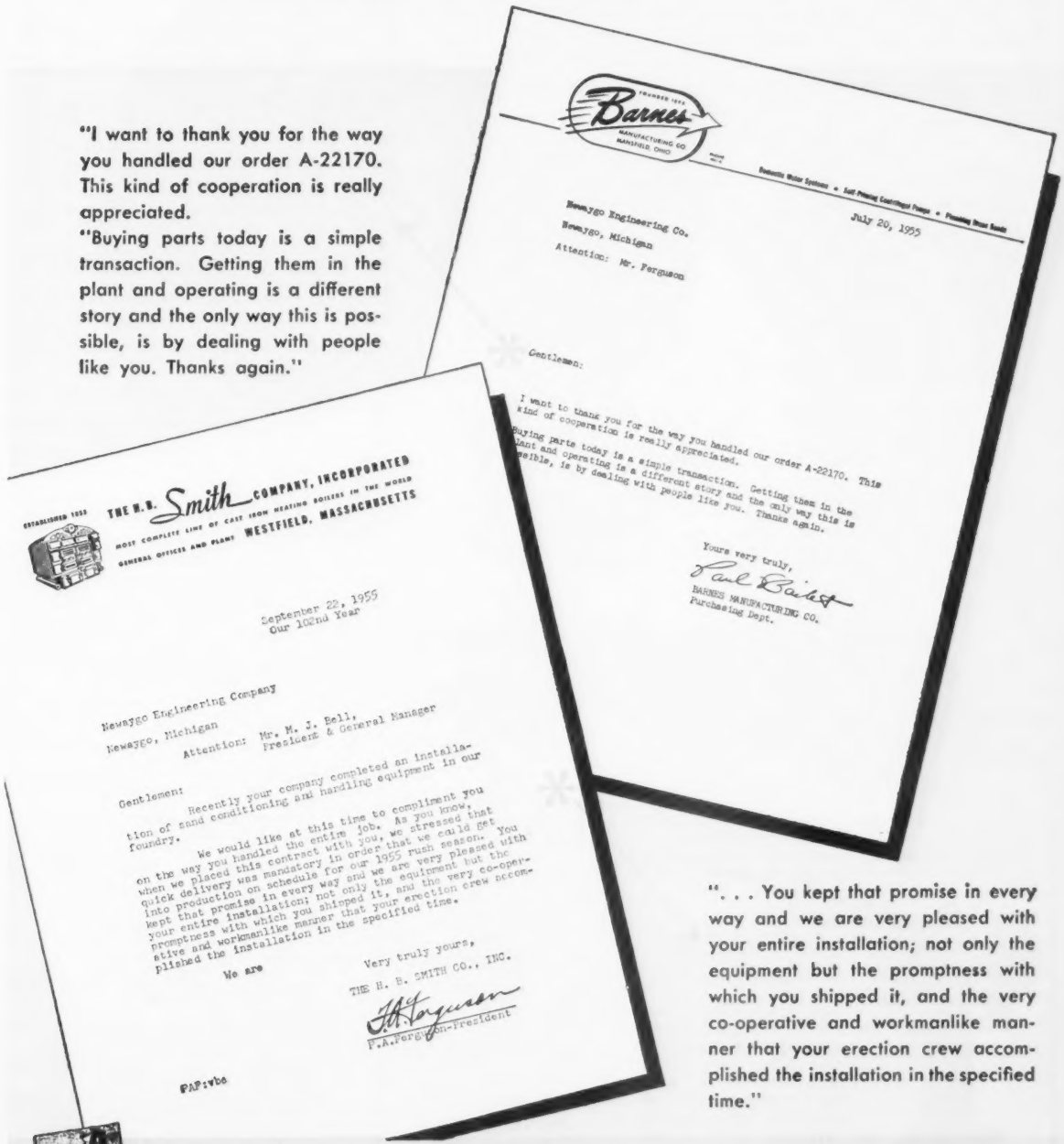
Take a look at the following: How a Foundryman Found Happiness; At Last—A Cure for Misruns; I Didn't Believe in Shell Molding; Gas Porosity *Can* be Stopped; The Truth about the CO_2 Process; Are Snotters Necessary?; What You Can Do about Scabs; Pearlitic Malleable Changed My Life; The Most Interesting Casting I Have Seen; Don't Be Ashamed To Use Fluxes; Weld Your Way to Success; Impregnation Makes the Difference; Quality Control for the Masses.

Do you have any favorites or other suggestions? F.G.S.

How important is RELIABLE SERVICE to your foundry?

From planning to installation . . . $50,000 to $600,000 jobs . . . these foundries found Newaygo Service as reliable as Newaygo Equipment for efficient, low-cost sand handling . . .

"I want to thank you for the way you handled our order A-22170. This kind of cooperation is really appreciated.
"Buying parts today is a simple transaction. Getting them in the plant and operating is a different story and the only way this is possible, is by dealing with people like you. Thanks again."



Barnes Manufacturing Co. Mansfield, Ohio

July 20, 1955

Newaygo Engineering Co.
Newaygo, Michigan
Attention: Mr. Ferguson

Gentlemen:

I want to thank you for the way you handled our order A-22170. This kind of cooperation is really appreciated.

Buying parts today is a simple transaction. Getting them in the plant and operating is a different story and the only way this is possible, is by dealing with people like you. Thanks again.

Yours very truly,
Paul Baker
BARNES MANUFACTURING CO.
Purchasing Dept.

THE H. B. Smith COMPANY, INCORPORATED
ESTABLISHED 1855
MOST COMPLETE LINE OF CAST IRON HEATING BOILERS IN THE WORLD
GENERAL OFFICES AND PLANT WESTFIELD, MASSACHUSETTS

September 22, 1955
Our 102nd Year

Newaygo Engineering Company
Newaygo, Michigan
Attention: Mr. M. J. Bell,
President & General Manager

Gentlemen:

Recently your company completed an installation of sand conditioning and handling equipment in our foundry.

We would like at this time to compliment you on the way you handled the entire job. As you know, when we placed this contract with you, we stressed that quick delivery was mandatory in order that we could get into production on schedule for our 1955 rush season. You kept that promise in every way and we are very pleased with your entire installation; not only the equipment but the promptness with which you shipped it, and the very co-operative and workmanlike manner that your erection crew accomplished the installation in the specified time.

We are

Very truly yours,
THE H. B. SMITH CO., INC.
F. A. Ferguson-President

FAF:vbs

". . . You kept that promise in every way and we are very pleased with your entire installation; not only the equipment but the promptness with which you shipped it, and the very co-operative and workmanlike manner that your erection crew accomplished the installation in the specified time."

A copy of "Planned Mechanization for Foundries" is yours for the asking. Write, wire, or phone today.

NEWAYGO ENGINEERING COMPANY
NEWAYGO, MICHIGAN

Manufacturers of Neway® Mold Handling, Sand Handling and Conditioning Equipment

America's Outstanding Grinders!

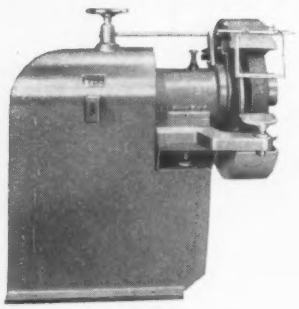
Maximum performance . . . production . . . economy . . . quality . . . speed . . . with minimum cost of operation and maintenance

UNITED STATES ELECTRICAL TOOL COMPANY GRINDERS for every purpose . . . for every industry

SUPERB EXAMPLES OF THE TOOLMAKERS' CRAFT

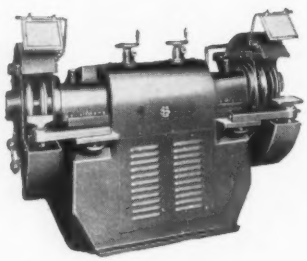
60 years of skill and experience are embodied in every United States Electrical Tool—resulting in utmost efficiency and assured satisfaction. All rotating parts and spindles are precision-balanced dynamically by

• THE LATEST ELECTRONIC BALANCING EQUIPMENT



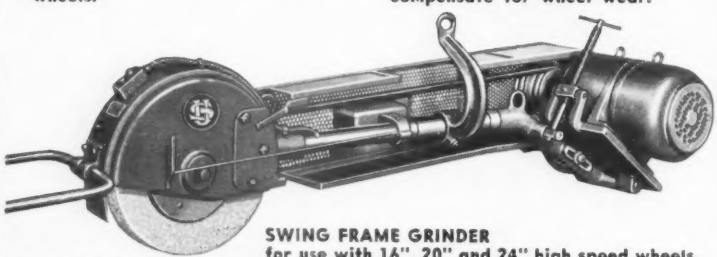
SINGLE END VARI-SPEED SNAGGING GRINDER
7½ to 40 HP MODEL 61 VS

Ideal stub user. Constant peripheral speed regardless of wheel diameter for increased production and longer wheel life. For vitrified or high speed grinding wheels.



DUAL MOTOR VARI-SPEED SNAGGING GRINDER
7½ to 40 HP MODEL 62 VS

For vitrified or high speed grinding wheels. Each wheel operates independently. Built to maintain constant wheel periphery and to compensate for wheel wear.



SWING FRAME GRINDER
for use with 16", 20" and 24" high speed wheels.

Perfect balance laterally and rotatively for easy handling; perfect visibility due to absence of outboard bearings; fabricated boiler plate steel guards; ball-bearing, fan-cooled, totally enclosed motor; single suspension at center, double suspension at wheel head and motor end; angular adjustment and many other features.

GENERAL PURPOSE FLOOR GRINDER MODEL 500

Totally enclosed motor, 1 to 5 hp; push button starting with overload protection; ball - bearings enclosed in dust-tight housings; enclosed adjustable wheel guards; tool tray and lift-out water pot; ball-bearing.

WRITE TODAY FOR CATALOGS OF PORTABLE ELECTRIC TOOLS, GRINDERS, BUFFERS, ETC.

THE UNITED STATES ELECTRICAL TOOL COMPANY
3646 Llewellyn Street, Cincinnati 23, Ohio

CALENDAR of Meetings

Mar. 13-14—Foundry Educational Foundation, college-industry conference, Hotel Cleveland, Cleveland.

Mar. 15-16—California Regional Conference, Claremont Hotel, Berkeley.

Mar. 18-19—Steel Founders' Society of America, annual meeting, Drake Hotel, Chicago.

Mar. 25-29—American Society for Metals, Western Metals Congress and Exposition. Ambassador Hotel and Pan-Pacific Auditorium, Los Angeles.

Apr. 8-10—American Institute of Mining, Metallurgical and Petroleum Engineers, open hearth, steel and blast furnace, coke oven and raw materials conference, Penn-Sheraton Hotel, Pittsburgh.

Apr. 10-11—Malleable Founders' Society, market development conference, Edgewater Beach Hotel, Chicago.

Apr. 12-13—East Coast Regional Conference, sponsored by Metropolitan, Chesapeake and Philadelphia chapters, AFS, Benjamin Franklin Hotel, Philadelphia.

Apr. 29-May 3—Seventh National Materials Handling Exposition, Convention Hall, Philadelphia.

Apr. 30-May 1-2—Investment Casting Institute, annual spring meeting, Sheraton Park Hotel, Washington.

May 6-10—American Foundrymen's Society, 61st annual convention and castings exhibit, Cincinnati.

May 19-22—Industrial Heating Equipment Association, spring meeting, Homestead, Hot Springs, Va.

May 20-23—Design Engineering Show, Coliseum, New York City.

June 10-11—Magnesium Association, summer meeting, Homestead, Hot Springs, Va.

June 13-14—Malleable Founders' Society, annual meeting, Broadmoor, Colorado Springs, Colo.

June 16-21—American Society for Testing Materials, annual meeting, Chalfonte-Haddon Hall, Atlantic City, N.J.

June 20-21—American Foundrymen's Society, 2nd annual foundry instructors' seminar, Kellogg Center, Michigan State University, East Lansing, Mich.

June 20-22—Penn State Foundry Conference, sponsored by Pennsylvania State University in co-operation with AFS chapters in New York and Pennsylvania and several independent foundry groups. Pennsylvania State University, University Park, Pa.

June 23-25—Alloy Casting Institute, annual meeting, Homestead, Hot Springs, Va.

June 27-28—Refractories Institute, annual meeting, Greenbrier, White Sulphur Springs, W. Va.

Sept. 17-20—American Die Casting Institute, annual meeting, Edgewater Beach Hotel, Chicago.

Sept. 23-24—Steel Founders' Society of America, fall meeting, Homestead, Hot Springs, Va.

Sept. 26-28—Missouri Valley Regional Conference, sponsored by St. Louis, Tri-State, and Mo-Kan chapters, AFS, and Missouri School of Mines Student Chapter, Missouri School of Mines and Metallurgy, Rolla, Mo.

Oct. 9-11—Gray Iron Founders' Society, annual meeting, Drake Hotel, Chicago.

Oct. 12-15—Conveyor Equipment Manufacturers Association, annual meeting, Grand Hotel, Point Clear, Ala.

Oct. 17-18—Magnesium Association, annual convention, Biltmore Hotel, New York.

Oct. 17-19—Foundry Equipment Manufacturers Association, annual meeting, Greenbrier, White Sulphur Springs, W. Va.

Oct. 21-25—National Safety Council, national safety congress and exposition, Conrad Hilton Hotel, Chicago.

Nov. 4-8—American Society for Metals, national metals exposition and congress, International Amphitheatre, Chicago.

Nov. 7-8—National Foundry Association, annual meeting, Waldorf-Astoria Hotel, New York.

Nov. 11-13—Steel Founders' Society of America, technical and operating conference, Hotel Carter, Cleveland.

when I think of the time I'd have saved with

Plenco shell molding phenolics"

Production time saved is but one advantage enjoyed by shell molders with Plenco molding resins. Notable reductions of material required is another commonly experienced economy . . . as is the resulting drop in labor costs. Through the application of Plenco shell molding resins, improvement of the shell-cast parts themselves is often so immediately apparent that inspection of the parts by the end-user becomes a mere formality. Consult with us about the Plenco molding compound to meet *your* need, speed *your* production.

Serving the plastics industry in the manufacture of high grade phenolic molding compounds, industrial resins and coating resins.

PLENCO PHENOLICS

FOR BETTER PLASTIC PRODUCTS

PLASTICS ENGINEERING COMPANY

Sheboygan, Wisconsin

Circle 565 on Inquiry Card—Page 225

STEEL FOUNDRIES— *Here's Proof that*

B-11 Wheels grind off

Users tell how the new Norton resinoid bonded wheels add the "TOUCH of GOLD" that cuts snagging costs

You get faster cutting action and longer wheel life, with the new B11 wheels on your floor stands. Used with regular ALUNDUM* abrasive for snagging steel castings.

Reports on wheels made with the newest Norton resinoid bond — the B11 — are now coming in. Here are some typical comments from steel foundries around the country:

- *From New Jersey: "B11 wheels averaged 182 pounds of metal removed per wheel. Best previous was 125 pounds."*
- *From Illinois: "Cut best of any wheels ever used on this work. Very little dressing required."*
- *From Wisconsin: "B11 wheels cut faster, give more pieces between dressings, and more pieces per wheel."*
- *From Tacoma, Washington: "B11 wheels best ever used. Reordered 60 for floor stands and 80 for swing frames."*
- *From Massachusetts: "Hogs off large gates and risers with great rapidity. Best all-around wheel so far."*

The Norton B11 resinoid bond is an important contribution to progress in the widest range of snagging operations. Wheels made with it are more uniform in structure, with better balance. As a result, they grind cooler and faster. And on swing frame and portable machines they "hug that work" closer, with less vibration and bounce.

Another big advantage of B11 construction is that it gives you closest possible duplication. Hardness increments are evenly spaced through-

more steel per dollar

out the entire grade scale. And B11 wheels can be supplied in half-grade increments, making it even easier for you to choose exactly the right wheel for every job.

For snagging steel

the B11 bond and tough, sharp ALUNDUM abrasive make a powerful "Touch of Gold" team. In *your* cleaning room this combination means less operator fatigue, longer wheel life, time and money saved — advantages that add up to more profitable grinding for you.

See Your Norton Distributor

for further facts. Distributors in all industrial areas listed under "Grinding Wheels" in the yellow pages of your telephone book. Behr-Manning Division, Troy, New York. *Export:* Norton Behr-Manning Overseas, Inc. **For information write Norton Company, Worcester 6, Mass.**

W-1690

NORTON
ABRASIVES

Making better products...
to make your products better

NORTON PRODUCTS: Abrasives • Grinding Wheels • Grinding Machines • Refractories

BEHR-MANNING PRODUCTS: Coated Abrasives Sharpening Stones • Pressure-Sensitive Tapes

*Trade-Mark Reg. U. S. Pat. Off. and Foreign Countries

You make deep cost cuts when you grind steel castings with B11 — ALUNDUM abrasive wheels. On swing frames the better balance and less vibration of B11 wheels reduces operator fatigue.

Circle 566 on Inquiry Card—Page 225

Guarantee TOP Performance and Maximum Life!

Specify THESE TOP QUALITY FEATURES...

(Standard on Miller Cylinders at no extra cost)

Specify CASE HARDENED CHROME PLATED PISTON RODS

On all Air and Hydraulic Cylinders

Benefits To You

CASE-HARDENED Piston Rods (52-54 Rockwell "C") provide practically complete protection against damage from hammer blows, wrench-dropping, mishandling, and similar occurrences. ***Available from Miller at no extra cost.***

The HARD CHROME PLATING over the case-hardened rods protects against scratch-damage and rust. ***Available from Miller at no extra cost.***

Specify "TEFLON" WIPERS

On all Air and Hydraulic Cylinders

Benefits To You

"TEFLON" Rod Wipers and "TEFLON" Hydraulic Piston Rod Seals withstand temperatures from—100°F. to plus 500°F. They are impervious to practically all known chemicals, including the fire-resistant, special, and standard hydraulic fluids in current use. ***Available from Miller at no extra cost.***

Specify TEFLON HYDRAULIC ROD SEALS

On all Hydraulic Cylinders

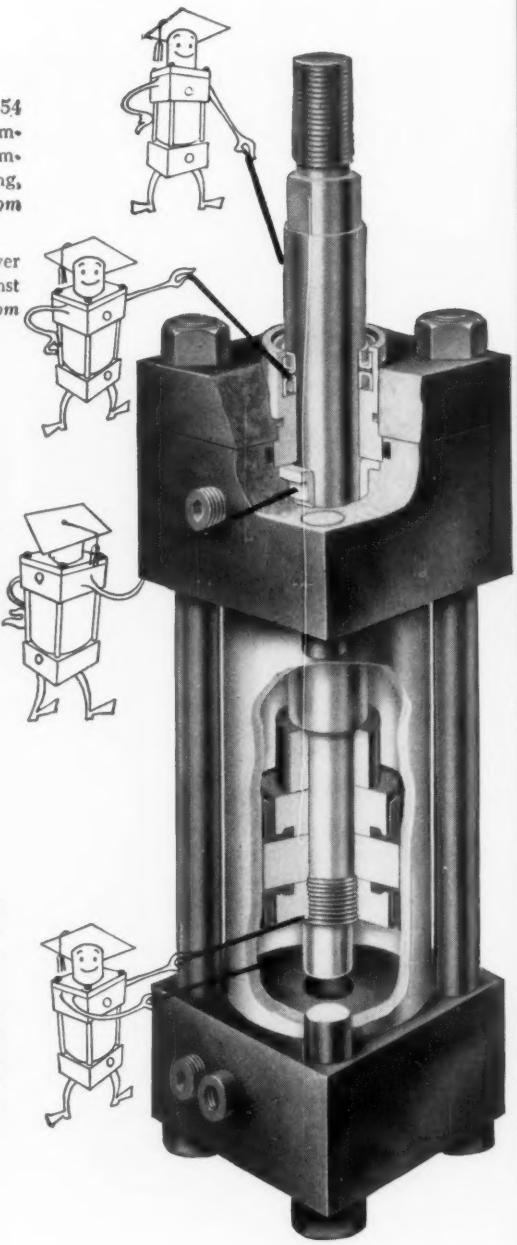
Specify RUST RESISTANT SURFACES

On all Air and Hydraulic Cylinders

Benefits To You

Highest quality Black Ferric Oxide Finish provides rust protection in air cylinder operation and on all cylinders during shipping and installation.

Cylinder heads, caps, mountings, pistons, followers, tie rods, and the unplated portions of the piston rods have this finish ***at no extra cost on all Miller cylinders.*** (This finish not recommended for water service)



NOTE: On all Miller Hydraulic Piston Seals: Leather Cup Seals are *standard*, Piston Ring Seals are optional *at no extra cost*, and "Teflon" Cup Seals are available *at extra cost.*

You may wish to route this entire page to the proper department in your company, by using this handy form. Additional copies on request. →

To (Dept.)_____

"On all our future cylinder requirements, please specify the above quality features."

Signed_____

Title_____

Member of the National Fluid Power Association

SALES AND SERVICE FROM COAST TO COAST

CLEVELAND • YOUNGSTOWN • DAYTON • TOLEDO • CINCINNATI • COLUMBUS
PITTSBURGH • PHILADELPHIA • BOSTON • HARTFORD • NEW YORK CITY
BUFFALO • ROCHESTER • MINNEAPOLIS • GRAND RAPIDS • DETROIT • FLINT
FORT WAYNE • SOUTH BEND • INDIANAPOLIS • MILWAUKEE • LOUISVILLE
KANSAS CITY • SEATTLE • LOS ANGELES • SAN FRANCISCO • BALTIMORE
DENVER • ST. LOUIS • MOLINE • CHICAGO • HOUSTON • ATLANTA
TORONTO, CANADA and OTHER AREAS

Miller

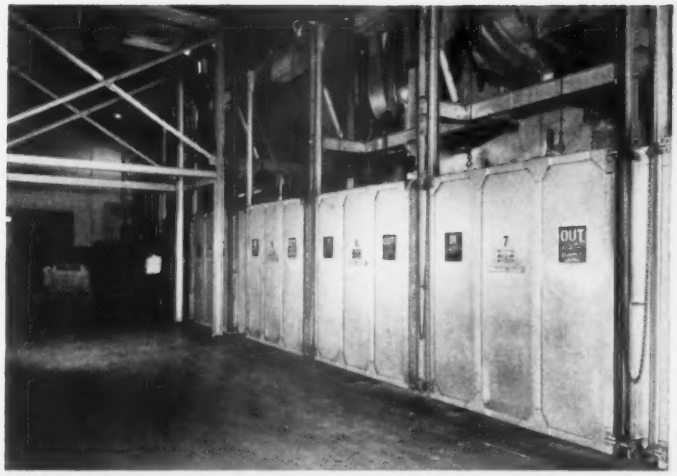
Circle 567 on Inquiry Card—Page 225

MILLER FLUID POWER DIVISION FLICK-REEDY CORP.

2034 N. Hawthorne Ave., Melrose Park, Ill.

AIR & HYDRAULIC CYLINDERS • BOOSTERS • ACCUMULATORS
COUNTERBALANCE CYLINDERS

How much money can you really save using



Coleman Transrack Ovens

COLEMAN OVENS

in your core department?

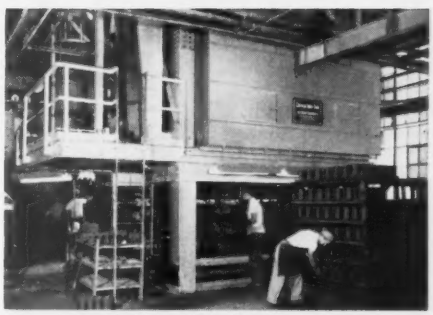
Performance records in all classes of foundries prove that Coleman Ovens reduce overall core department costs by as much as 50%! In fact, many Coleman Ovens pay for themselves out of savings in less than a year!

Coleman Core and Mold Ovens, through modern engineering and more than half a century of specialized foundry experience, have an outstanding record for reducing scrap losses, fuel, material and labor costs. The uniform heating, accurate controls and work handling methods found exclusively in Coleman Ovens are responsible for immediate improvement in cores, molds and casting quality.

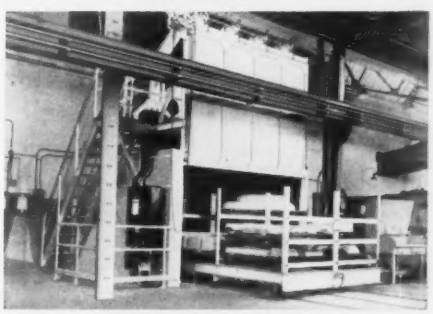
Since production savings are so important to profits, it will pay you to investigate the unusual advantages of Coleman Ovens immediately. Let our experienced engineers show you how modern Coleman Ovens can pay dividends in your foundry.

As builders of the world's only complete line of foundry ovens, we have no reason to recommend any but the best oven for your purpose.

WRITE FOR BULLETIN 54



Coleman Tower® Oven



Coleman Car-Type Oven

Coleman Dielectric Oven

A COMPLETE RANGE OF TYPES AND SIZES:

for every core baking and mold drying requirement:

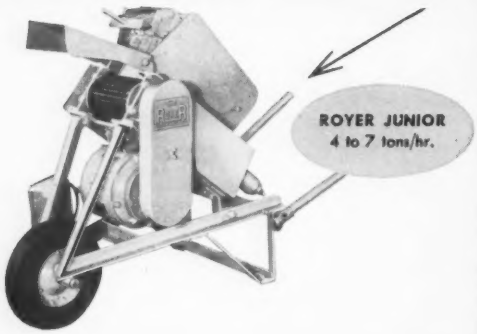
Tower Ovens • Horizontal Conveyor Ovens • Car-Type Core Ovens • Car-Type Mold Ovens • Transrack Ovens • Rolling Drawer Ovens • Portable Core Ovens • Portable Mold Dryers • Dielectric Core Ovens

THE FOUNDRY EQUIPMENT COMPANY

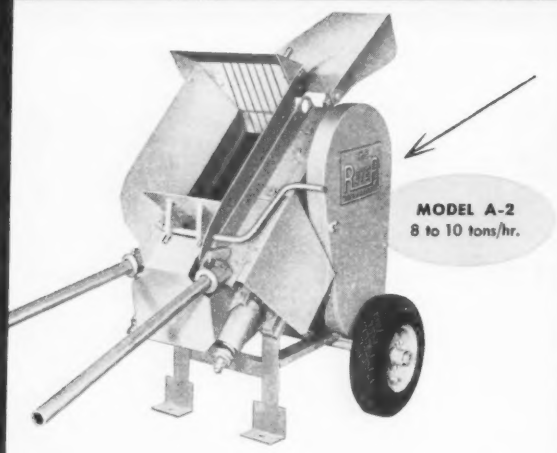
1821 COLUMBUS ROAD CLEVELAND 13, OHIO

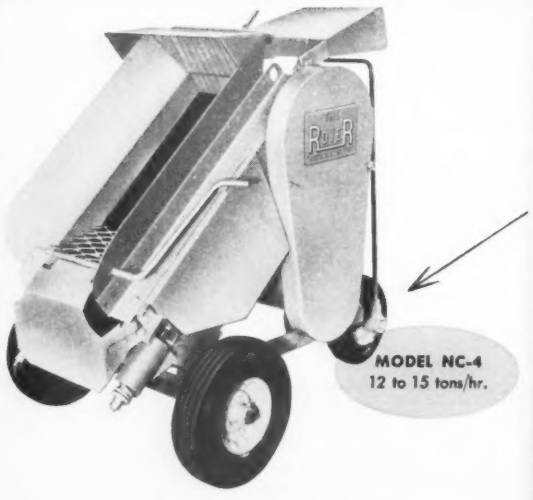
WORLD'S OLDEST AND LARGEST FOUNDRY OVEN SPECIALISTS

MEMBER FEMA



Get fast, efficient sand preparation at low cost . . . IN THE TONNAGES YOU NEED





To meet the varying requirements for *sand conditioning and aeration* in the small and medium size foundry (job or production), the core room and side floor, Royer offers the Separators, Blenders and Aerators shown here. Fast, efficient and durable, these units enable you to choose a machine *designed for the tonnages you need*, regardless of the type of sand you use or the kind of metal you pour.

Here are a few of the advantages you'll gain with a Royer:

- Lowest labor costs
- Less new sand
- Less need for facing sand
- Reduced blows, drops, runouts and rough surfaces
- Low cleaning room costs
- Reduced discount losses
- Better sand cooling
- Riddling time practically eliminated

Foundrymen call Royer the "foremost in sand conditioning equipment" because Royer machines are in use throughout the world. *The majority of the foundries have bought additional units*, positive proof of satisfactory service.

Contact us today—by letter, wire or telephone—and we'll rush you descriptive literature describing the unit designed to meet your needs. Or, you can have our "foundry-wise" agents survey your problems with you.

Foundry-wise agents throughout the U. S.
EXPORT DEPT.
10406 South Western Ave.
Chicago 43, Ill.
IN CANADA
Brown Engineering Corp.
15 Alcorn Ave., Toronto, Ont.

ROYER

ROYER FOUNDRY & MACHINE CO.
159 PRINGLE STREET / KINGSTON, PENNA.
FOREMOST IN SAND CONDITIONING EQUIPMENT

Circle 569 on Inquiry Card—Page 225

9 things to check if shells stick

You can profit most from the inherent advantages of shell molding—close tolerances, smooth surfaces and reduced labor costs, if you have the latest technical information on shell mold and core making techniques. Here's where General Electric's technical service and technical literature can help.

For example, G.E.'s *"59 Answers to Your Shell Molding Problems"* tells you nine things to look for when shells stick . . . and what to do about them. Here, too, you'll find answers to other shell molding problems you may have encountered.

And when it comes to shell molding resins, G.E. has a range of products, each designed to help you make better shell molds and cores for the job at hand. *G-E 12374*, fast curing resin for high speed production, minimizes warpage because of its "hot rigidity." *G-E 12368* is best for intricate patterns with deep draw and minimum draft. *G-E 12392* is a good general purpose resin. It has no tendency to peel; properties of build-up and release are good. *G-E 12316* shell bonding resin joins shell mold halves efficiently, and *G-E SM-55* silicone release agent gives quick, clean removal of shells from the pattern.

For a copy of "59 Answers . . .", or for other technical information, write General Electric Company, Section F-2, Chemical Materials Department, Pittsfield, Mass.

IF SHELLS STICK . . .

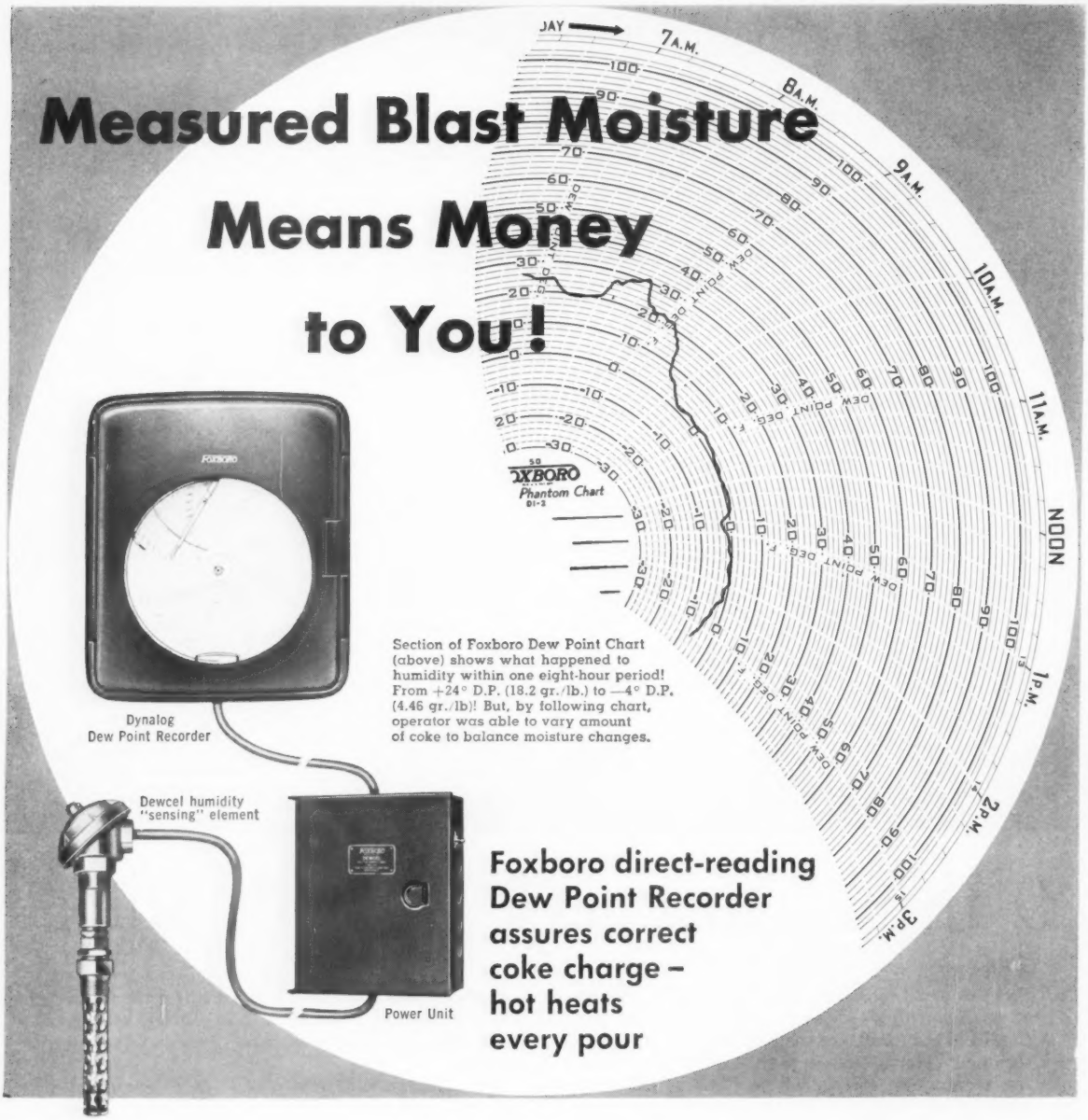
• Check pattern for undercuts or rough spots • Be sure new patterns are thoroughly conditioned • Polish and recondition abraded patterns • Use proper lubricant • Avoid excessive lubrication • Clean pattern thoroughly • Use slower curing resin • Check ejection pin platen level • Look for loose pattern pieces.

Progress Is Our Most Important Product

GENERAL ELECTRIC

Circle 570 on Inquiry Card—Page 225

Measured Blast Moisture Means Money to You!



Section of Foxboro Dew Point Chart (above) shows what happened to humidity within one eight-hour period! From +24° D.P. (18.2 gr./lb.) to —4° D.P. (4.46 gr./lb)! But, by following chart, operator was able to vary amount of coke to balance moisture changes.

Foxboro direct-reading Dew Point Recorder assures correct coke charge – hot heats every pour

You can accurately compensate for the widest **variations** in blast moisture . . . pour consistently **hot** heats every day using the Foxboro Dew Point Recorder. Its *continuous* chart record of atmospheric moisture provides a foolproof basis for modifying the coke charge . . . eliminates coke waste and costly "cold metal" pours.

And you don't have to "baby" *this* Recorder. Accuracy is unaffected by ambient temperature changes. No critical adjustments . . . practically no maintenance! Step up efficiency *and* economy in *your* cupola operation. Write, or ask your nearby Foxboro Field Engineer for Data Sheet 330-1 on recording, and control, of blast moisture.

THE FOXBORO COMPANY, 323 NEPONSET AVENUE, FOXBORO, MASS., U. S. A.

FOXBORO
REG. U. S. PAT. OFF.

DEW POINT RECORDERS

FACTORIES IN THE UNITED STATES, CANADA, AND ENGLAND

LET
MISS
LIQUIDIZER
GUIDE YOU
TO

Increased yield!

Soffel's Exothermic
Carbon-Free Liquidizers
will increase yield
and reduce feeding metal.
Contact your PMP Distributors
for a demonstration.

You have our permission
to clip and post this ad
on your bulletin board.

Photo by H. Armstrong Roberts

PITTSBURGH METALS PURIFYING CO., Inc.
1352 Marvista St., N. S. Pittsburgh 12, Pa.

"WORLD'S LARGEST MANUFACTURER OF FLUXES, PURIFIERS AND EXOTHERMIC COMPOUNDS FOR ALL METALS AND ALLOYS"

Get controlled, consistent results like this at low equipment cost with . . .

The photos below provide visible proof of the efficiency, speed and consistent quality of resin coated sand that can be turned out with the National SHELL-MULL. Designed to overcome many of the common failings of shell sand preparing units, SHELL-MULL offers these principal advantages which are now being *job proven* by leading practical foundrymen the country over, including *every* principal automobile manufacturer:

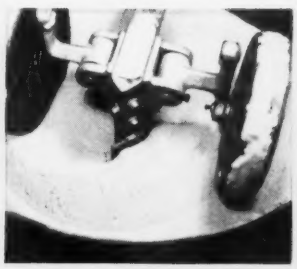
Standardized, low cost equipment; faster, controlled coating and considerably reduced resin usage.

Look at the results . . . look at the equipment described below, then write for details regarding trial batches of your sand—run under your own plant conditions!

Resin and solvent are quickly dispersed prior to introduction of controlled, heated air.

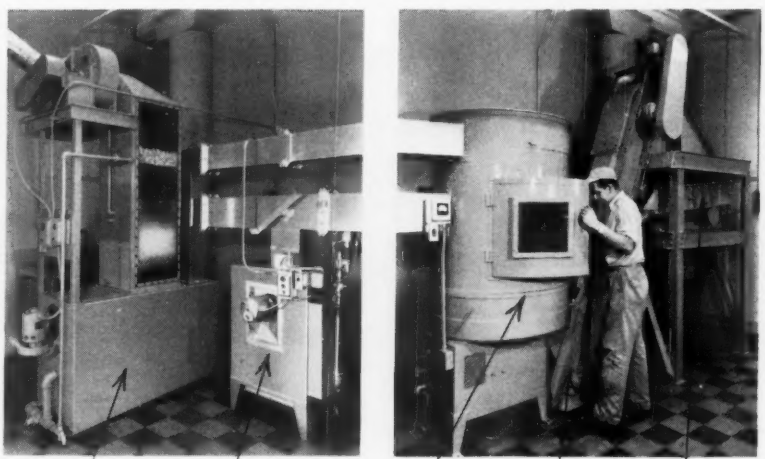
Heat on: Sand and resin mix is beginning to dry out and break down.

Farther along: Mix is beginning to powder rapidly. Large lumps disappear quickly at this point until . . .



Before discharge—all sand is coated and heat is dispersed. Small lumps remaining will be recycled through *Elevayor* until completely dispersed.

HERE'S THE EQUIPMENT



It's simple, it's practical, it's standard. Designed by and for foundrymen, SHELL-MULL offers these features—so important to the effective utilization of resin bonded sands:

1. *Low equipment cost.* Reduction of total cycle permits use of smaller standard Simpson Mix-Mullers and auxiliary equipment for required sand capacity.

2. *Design of equipment* reduces sensitivity to variations in process time, temperature, etc., resulting in controlled uniformity from batch to batch.

3. *Large batch* in Simpson Mix-Muller reduces percentage of error due to slight variations in sand and resin weights.

4. *Low operating costs.* Standard drive and standard motors are used in all Simpson Mix-Mullers.

5. *Consistent results* from batch to batch.

6. *Separate air heater* gives accurate control of sand and air temperature independently of muller cycle.

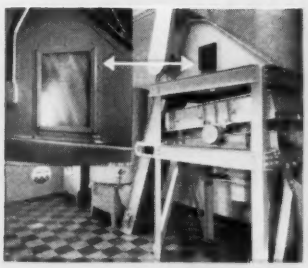
7. *Pits are not required.* The Shell-Mull Unit is designed to be installed at floor level.

8. *Maximum efficiency* due to more uniform and more thorough coating.

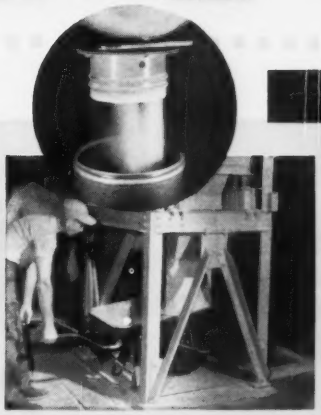
Circle 573 on Inquiry Card—Page 225

NATIONAL

SHELL-MULL



Discharged into National Elevayor, sand is aerated to eliminate residual solvents and elevated to . . .



Screen where lumps are completely removed or recycled. Completely coated, flowable and lump free sand is ready for immediate use.

New NATIONAL Service Available — Make your own production scale tests with SHELL-MULL:

The services of this simple, practical unit are now being offered at no charge to foundrymen.

The equipment shown at left is part of National's *Performance Laboratory*. Capable of producing 800 to 1200 lbs. of coated sand per hour, it is not a pilot plant . . . equipment used is exactly the same as that now in use in many leading foundries. Full scale tests can be made with your own sand, a resin of *your* choice and under *your own* supervision. All tests are conducted to provide the user with *tangible evidence* of the superiority of SHELL-MULL in the efficient, *consistent* production of resin bonded sands that are in keeping with standards demanded by experienced foundrymen. The results of such a test can be invaluable to you.

Write today for full details regarding arrangements. There is, of course, no obligation.

MANUFACTURERS OF SIMPSON MIX-MULLERS

646 Machinery Hall Building

Chicago 6, Illinois

NATIONAL ENGINEERING COMPANY

F-572

FOUNDROMATIC
Dielectric
SAND CORE OVEN

The *Only* Electronic Oven That Can Give You These 4 Advantages

- **Exact Quality Control** . . . Adjustable electrode control permits correct compensation for physical variance in cores. Burning and incomplete baking are eliminated, even when cores have very thick or very thin sections.
- **"Load Master" Protection** . . . An automatic grid control assures correct drive to the oscillator tube regardless of oven load. Automatic conveyor control prevents electrical overload by controlling belt travel when load is too great for normal operation.
- **Simplified Operation** . . . "Tell-All" control panel, at eye level, enables operator to keep on top of the complete operation at all times — to maintain top quality with maximum speed and accuracy.
- **Extra Safety** . . . The *Foundromatic* core oven provides maximum safety for operator and machine. Metal cabinet is designed to trap radiation. Door interlocks shut off power when cabinet is opened for inspection.

Foundromatic is an Allis-Chalmers trademark.

Foundry Men — Be sure you get the fast production and reduced core costs possible with the *Foundromatic* sand core oven. For the complete story, see your A-C representative or write Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wisconsin. Ask for new Bulletin 15B7306C.

ALLIS-CHALMERS

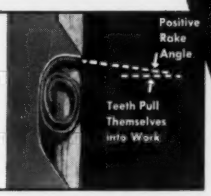
A-C ALLIS-CHALMERS

A-5326

Circle 574 on Inquiry Card—Page 225

Circle 575 on Inquiry Card→

TRIM CASTINGS SAFELY, FASTER, CLEANER



DoALL Claw-Tooth saw bands help themselves to easier, faster sawing. Take heavy cuts without breakage.

Cut Sawing Costs and reduce blade inventory with . . .

DoALL Claw Tooth Saw Bands

Your saw operators can remove ferrous and non-ferrous gates, risers and flash faster with less effort when you give them long-life, faster cutting DoALL Claw-Tooth saw blades. Here's why:

Claw-Tooth blades have added penetrating power—the positive rake angle teeth pull themselves into the work. You get bigger chips, smoother chip flow. Sawing is faster. The scientifically designed tooth and gullet shape means longer blade life, too. Teeth are securely anchored to the flexible back to take heavy cutting loads without breakage.

A trial blade will show how Claw-Tooth can cut *your* blade cost 50% or more . . . reduce your blade inventory, do a faster, safer job. They're available in custom welded band lengths to fit your machine or in 100 ft. or 500 ft. coils. Call your local DoALL Sales-Service Store or write for details. The DoALL Company, Des Plaines, Illinois.

the DoALL Zephyr Band Machine

36" throat depth, 20" work height, automatic brakes, durable guides and infinitely variable speed range choice to 15,000 fpm. See this heavy-duty machine in action. Ask to have a free demonstration at your plant.

Ask for New Catalog on Band Tools

Most complete and reliable aid to saw band selection. Specifications and application data on DoALL's Claw-Tooth, Precision, Buttress, Friction and Demon High-Speed Steel saw bands — plus other band tools for slicing, filing, grinding and polishing.

THE WORLD'S LARGEST MAKER OF BAND MACHINES AND BLADES — THEY GO TOGETHER.

SB-55

Call Your DoALL Service-Store

MACHINE TOOLS ..... CUTTING TOOLS ..... MEASURING INSTRUMENTS ..... SHOP SUPPLIES IN STOCK

RUGGED WORKER

YALE HOIST...MOST DEPENDABLE WHEN HANDLING JOBS ARE TOUGHEST

Yale Cable King Electric Hoists are rugged and dependable—built to give you top performance no matter how tough the lifting job. In fact, a Yale Cable King operates efficiently on heavier duty cycles than any other hoist in its class. That's because many outstanding engineering features are built into Yale Cable Kings—such features as Yale's exclusive automatic air-cooling system and load brake lubrication to dissipate brake heat and eliminate the need for cool-off time...a Weston type load brake which operates whether power is on or off...a high-torque, heavy-duty motor for instant response to power demand...a magnetic motor brake for instant safe-hold action and control of motor drift.

For full facts about Yale Cable King Electric Hoists (cap. ¼ to 15 tons), contact your local Yale Hoist distributor (he's listed in the Yellow Pages of your phone book under Hoists) or write to The Yale & Towne Mfg. Co., Philadelphia 15, Pa. Dept. A-343.

YALE* **INDUSTRIAL LIFT TRUCKS AND HOISTS**

*REG. U. S. PAT. OFF.

Gasoline, Electric & LP-Gas Industrial Lift Trucks • *Worksavers* • Warehousers • Hand Trucks • Hand and Electric Hoists

Circle 576 on Inquiry Card—Page 225

SIPAC T.M. NON-CARBONACEOUS CORE COATING THAT PRODUCES SMOOTHER FINISHED CASTINGS

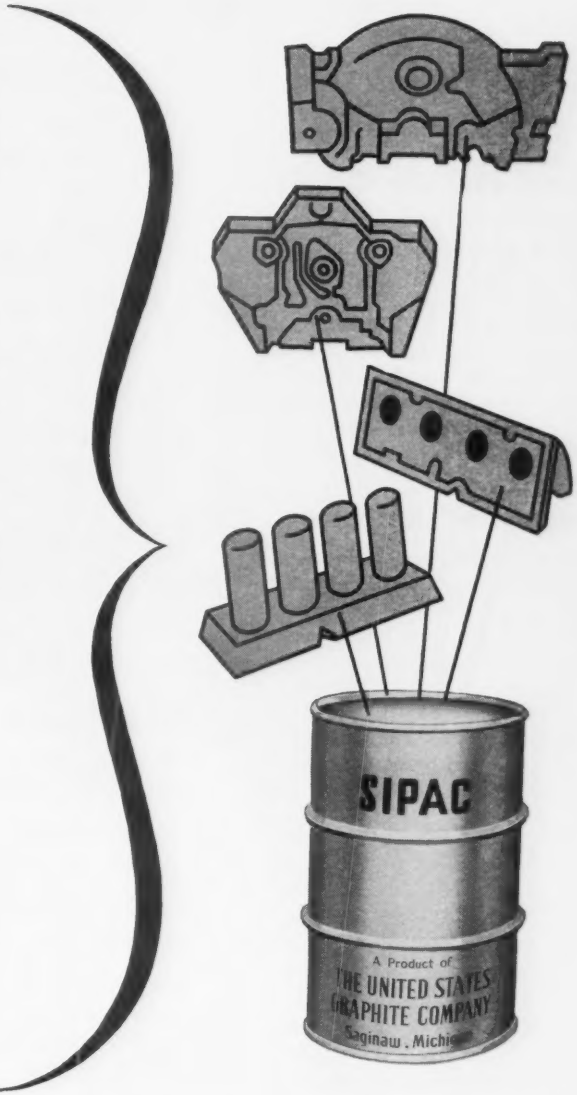
SIPAC United States Graphite Company's complete core coating, requires only the addition of water, and produces bright, gold-colored coating with fine, smooth surfaces—using any foundry sand.

SIPAC is non-carbonaceous and inert; will not react with any molten metal, including grey iron and steel. Clean to handle, its burnished gold color makes cores highly visible—a real help in placement of cores in the mold.

SIPAC costs less and gives improved casting quality. Resists flaking and completely seals core surfaces.

AVAILABLE in 55-gallon drums, (in paste form) ready for mixing and dilution to your desired Baume—even to a scale of 32—without settling.

WRITE TODAY for details about SIPAC or any other United States Graphite Company core and mold coatings.



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THE UNITED STATES GRAPHITE COMPANY

DIVISION OF THE WICKES CORPORATION, SAGINAW 14, MICHIGAN

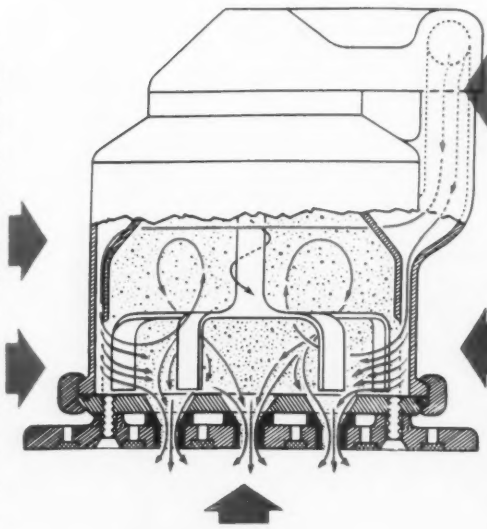
GRAPHITAR® CARBON-GRAPHITE • GRAMIX® SINTERED METAL PARTS • MEXICAN® GRAPHITE PRODUCTS • USG® BRUSHES

Circle 577 on Inquiry Card—Page 225

No other core making machine

"Cyclo-air" action utilizes air to its fullest capabilities, so it can perform all three basic functions—(1) enveloping sand grains to "lubricate" the sand, (2) transporting sand through blow holes into core box (3) ramming sand to proper hardness.

"Cut-away" drawing of the "40" model blow head, showing agitator and aerating air circuit.



"Cyclo-air" Air Circuit

Arrows show how air enters sand mass from all sides of blow head. Thousands of tiny air streams aerate and fluff-up sand – enveloping each grain with air to *neutralize the natural cohesion* between sand grains. Sand *must* be "lubricated" for flowability and proper ramming. "Sudden-ejection" methods get sand into the box, but do not provide for proper ramming.

"Cyclo-air" Agitator

Motor-driven plows, revolving during the blow cycle, combine with SAN-BLO's air circuit to aerate sand and move it to the blow holes, keeping them covered with sand at all times, to eliminate "piping". This makes it possible for the SAN-BLO to deliver 80% or more of its sand capacity into the core box and blow small cores or large cores from the same blow head.

Air Supply

The "40" SAN-BLO model uses a 2" air supply line and blow valve, to provide adequate air volume and pressure for proper mixing, transporting and ramming of the sand. SAN-BLO uses air efficiently, therefore economically – does not require a built-in air tank to store up air.

Standard Blow Head

SAN-BLO core blowers are equipped with a standard blow head that *never* has to be changed – yet all cores, small and large, are blown with equal efficiency. The "40" model will blow cores weighing from a few ounces each, up to 40 lbs. each, from the same blow head. No extra blow or shoot heads to buy – no time lost changing them!

Blow Holes

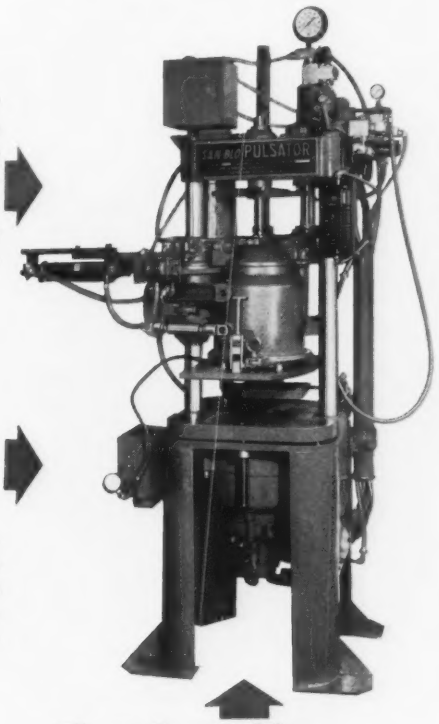
Because the SAN-BLO's agitator and aerating air circuit keep all blow holes covered with sand during the blow cycle, to prevent "piping", blow holes can be accurately located for any shape box to be blown – even boxes with undercuts or other complex shapes – with full assurance that sand will penetrate and fill every section of the box and be properly rammed. There's no restriction on core box shape, as there is with machines employing a "straight-down, shooting action".

Manufactured by

San-Blo Division

can match SAN-BLO's® "cyclo-air" action!

"Cyclo-air" action, plus other SAN-BLO features permits the blowing of all practical core sand mixtures (CO_2, oil, resin, dry compound, green sand), in wooden or metal core boxes— safely, with minimum core box wear and with equal efficiency.



"40" model SAN-BLO, fully equipped with "LPP", "Pulsator" and "Quick-Change Assembly".

Low Pressure Prefill

A timer and air valve arrangement by means of which *low air pressure* is used to "riddle" sand into the core box and *full line pressure* automatically cut in for ramming the core. Eliminates sand blasting effect, so that core box wear is held to a minimum.

Automatic Controls

Single-push-button control for automatic clamping, blowing and drawing operations. Assures a much faster production rate than possible with manually-operated machines.

Pulsator Type Blow

For blowing wooden core boxes safely. An air valve and control arrangement converts machine from continuous blow to a series of short blows, preventing excessive pressure build-up within the core box.

Quick-Change Assembly

For open-top boxes, a "quick-change, universal blow and vent plate assembly" provides for making up inexpensive blow sheets quickly, and changing them on the machine in a matter of seconds. No need for extra blow heads or shoot heads, no need to remove sand — just to change core boxes.

Clamping Table

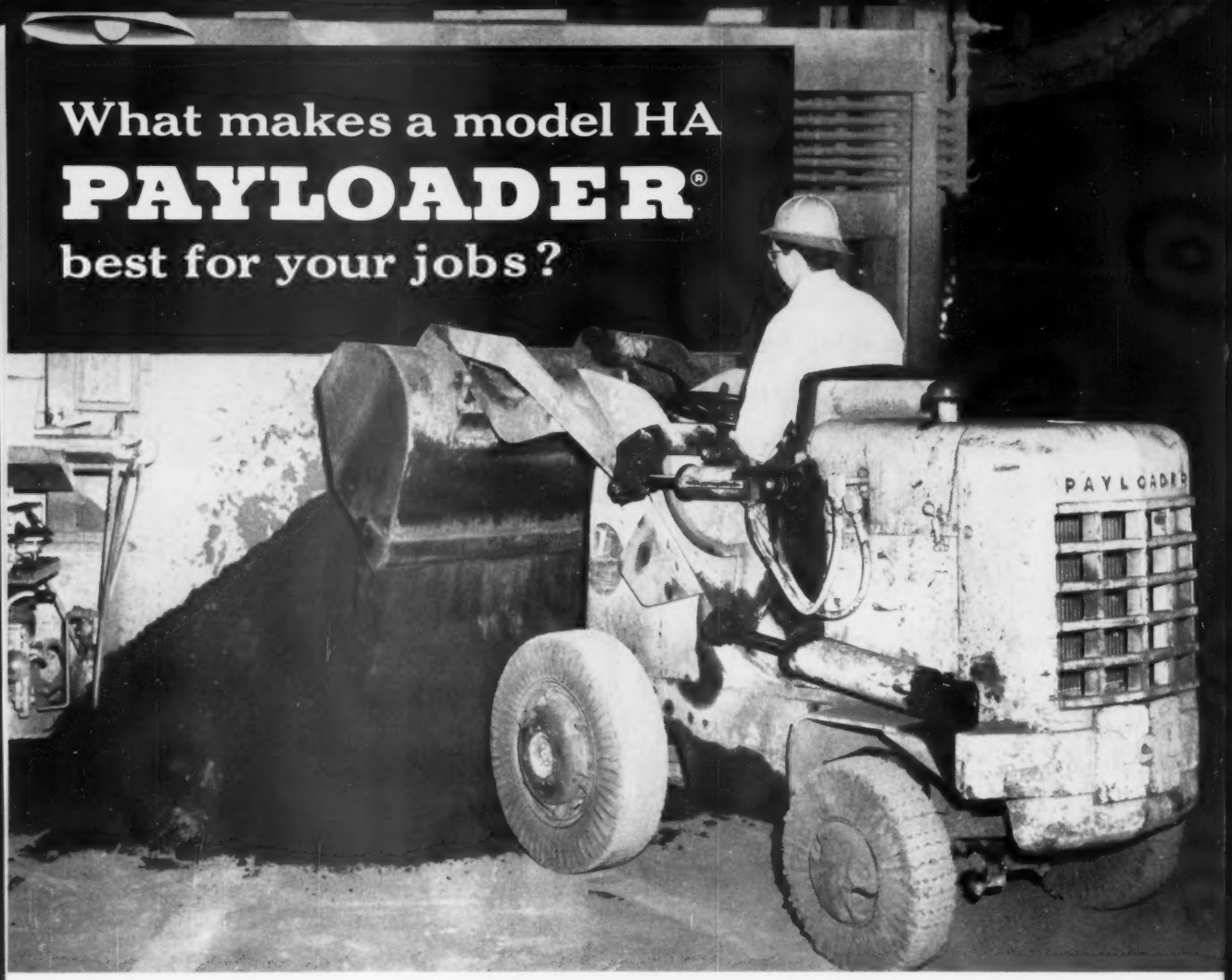
Air-oil controlled clamp-draw table, with 6" stroke, provides more-than-adequate clamping pressure for "blow-proof" vertical clamping of all core boxes. By fastening cope half of core box to the blow plate, cores can be drawn.

We'd appreciate an opportunity to tell you more about the SAN-BLO *— the modern, versatile core blower. Write for full information or ask our sales engineer to call.*

FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION MEMBER FEMA

The **FEDERAL FOUNDRY SUPPLY** *Company* 4600 EAST 71st STREET · CLEVELAND 5, OHIO

What makes a model HA PAYLOADER® best for your jobs?



Shortest turning radius

Higher dumping height

Biggest bucket (18 cu. ft. payload)

Hydraulic load-shock-absorber

40° bucket tip-back at ground level

Exclusive one-lever bucket control

Foundries and industrial plants report that the new model HA "PAYLOADER" is not only a great improvement over earlier models but is also way ahead of other front-end loaders in design and productivity — can dig more, carry more and deliver more tons of material per hour than heavier machines with larger engines. The exclusive 40° tip-back breakout action of the bucket at ground level gets and holds big loads close and low without spilling. Hydraulic load-shock-absorber smooths the ride and permits higher travel speeds. The low-mounted boom arm design makes operation faster, safer and easier because operator cannot get caught in mechanism and his line of vision is clear. Exclusive one-lever bucket control tips back, raises, dumps and lowers the bucket for simple, easy operation. Your nearby Distributor is ready to demonstrate the model HA or a larger "PAYLOADER" from the complete line.

THE FRANK G. HOUGH CO.
703 Sunnyside Ave., Libertyville, Ill.

Send data on "PAYLOADER" tractor-shovels

- ☐ Front-wheel-drive types: Models HA (1½ cu. ft.) and HAH (1 cu. yd.)
- ☐ Larger models up to 2¼ cu. yd.

Name _____

Title _____

Company _____

Street _____

City _____

State _____

26

SAY "NUFF"

PAYLOADER®
MANUFACTURED BY
THE FRANK G. HOUGH CO. LIBERTYVILLE, ILL.
SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY

Circle 579 on Inquiry Card—Page 225

Late News

February 25, 1957

SCRAP FIRMER: Prices of iron and steel scrap are slightly firmer after sliding about 20 per cent since last December's peak. The recent decline will have to go much farther to match some past sharp dips. Between August, 1953, and March, 1954, steelmaking scrap prices plunged 44 per cent and from December, 1948, to June, 1949, the drop was 55 per cent. Principal foundry grades now are quoted within a few dollars of levels prevailing a year ago.

The government temporarily is holding up on additional scrap export licenses to permit the Commerce Department to take a fresh look at the supply-demand picture in the light of the recent Battelle study (see page 97).

NEW GM FOUNDRY: General Motors will build a new aluminum foundry near Massena, N. Y. It will be operated by Chevrolet Division, and is to be completed by June, 1959. The foundry will be in the same area as a new $88 million aluminum reduction plant to be built by Reynolds Metals. Molten aluminum will be transferred directly from reduction pots to the foundry, eliminating metal pigging and remelting. GM has a similar arrangement with Reynolds at Jones Mill, Ark., and Ford has one in Alabama.

SELLS FOUNDRY: American Steel Foundries has sold its plant and 21-acre site in East St. Louis, Ill. It has been idle since April, 1954. The property will be developed by the buyers as an industrial district.

MATERIAL HANDLING: Bookings by material handling manufacturers dropped 14 per cent during the fourth quarter, but the 1956 total reached a new high 22 per cent ahead of 1955.

BUYS FOUNDRY: Detroit Gray Iron Foundry Co. has acquired Valley Steel Casting Co., Bay City, Mich. The former's production capacity will be increased an additional 20 per cent by a $250,000 expansion now being completed at Detroit. The company's other subsidiary operations include Lansing Foundry Co., Lansing, Mich., and Oakland Foundry & Machine Co., Rochester, Mich.

FOUNDRY BOOM IN BRAZIL: Ford Motor Co. will build a $4 million gray iron foundry in Sao Paulo, Brazil. It is part of a $21 million construction program there for truck manufacture. The foundry will produce 100 sets of cylinder blocks, heads and miscellaneous castings daily, and is scheduled to start operations in 1959.

A month ago General Motors announced plans for a $10 million foundry and machine shop—also for truck manufacture—to be built near Sao Paulo. In the same city a newly completed foundry of Maquinas Piratininga S. A. has contracted to furnish 100 tons of gray iron castings monthly to Willys Motors, whose Brazilian subsidiary is constructing a new engine plant there.

FREIGHT CARS: January orders for freight cars of 5328 compare with 1818 a year ago. Shipments of 7822 cars were the highest in over three years. With backlogs totaling 114,656 on Feb. 1, car shops have heavy operations in prospect for many months.

NEW FOUNDRY: Austenal Inc. is building an 85,000-sq-ft plant at LaPorte, Ind., for the production of investment castings. To be completed by Sept. 1, it will have about 300 employees initially, and will be Austenal's third production unit.

PERSONALS: Herbert F. Scobie, recently field manager, Non-Ferrous Founders' Society, was named executive secretary, succeeding James W. Wolfe, retired. Darlene D. McDermott was appointed assistant secretary-treasurer . . . W. D. Bailey Jr., vice president, Westlectric Castings Inc., Los Angeles, was made manager of Coquitlam Development Co. Ltd., which is building a new steel foundry near Vancouver, B. C. . . . Joseph J. Manzella was named plant and production manager and Rex Harrison sales manager, Reading Gray Iron Castings Inc., Reading, Pa. . . . Oberdorfer Foundries Inc., Syracuse, N. Y., has appointed

R. L. Purcell vice president in charge of foundry sales and J. J. Conley secretary . . . L. C. Hewitt was elected vice president-research and development, Ironton Fire Brick Co., Ironton, O.

DIE CASTERS ELECT: New officers elected by the Society of Die Casting Engineers are: President, Harry E. Eriksen, Chrysler Corp.; vice president, Harry Cagin, Halex Die Casting Co.; trustees, William Van Raaphorst, American Mold Engineering, Dean L. Rockwell, Clifford-Rockwell Co., and Harris R. Shimel, General Motors Corp. George F. Griffenham was appointed executive secretary and Meyer R. Tenenbaum treasurer.

FOUNDRY PRACTICE: A panel discussion of modern foundry practices will be held the morning of March 20 during the National Production Meeting and Forum, Society of Automotive Engineers, at Hotel Statler, Buffalo. The panel, headed by George H. Johnson, production superintendent, Chevrolet Tonawanda Foundry, will include Leonard Wood and Willard Parker of Chevrolet Tonawanda; John Donaldson, C. O. Bartlett & Snow Co.; Lyle Clark, Armour Research Foundation; C. Dale Evans, Central Foundry Division, GMC; A. M. Clark, Ford Motor, and Charles Collins, Pontiac Foundry.

OBITUARY: Charles A. Gutenkunst Jr., 57, president, Milwaukee Malleable & Grey Iron Works, Milwaukee, and a past president of the Malleable Founders' Society, died in Rochester, Minn., Feb. 16 . . . Duncan P. Forbes, 60, chairman, Gunite Foundries Corp., Rockford, Ill., and a past president of the American Foundrymen's Society, died Feb. 15 . . . B. A. Miller, 55, vice president and general manager, Crown Non-Ferrous Foundry Inc., Chester, Pa., died Feb. 17.

MISCELLANY: A. P. Green Fire Brick Co., Mexico, Mo., has acquired Richard C. Remmey Son Co., Philadelphia . . . Production of primary aluminum in January was 147,030 tons against 148,391 in December and 140,394 a year ago . . . Association of Manufacturers of Chilled Car Wheels has changed its name to the Railway Wheel Association . . . Domestic smelter production of slab zinc in 1956 reached an all-time high of 1,062,954 tons, 3 per cent over the previous record of 1955. The die casting industry consumed about 360,000 tons.

Prices of Foundry Metals and Coke

(As of Feb. 22, 1957)

FOUNDRY COKE

(Per net ton, f.o.b. ovens)

BEEHIVE	
Connellsville	$17.50-18.50
OVEN	
Birmingham	$28.85
Buffalo	30.50
Detroit	30.50
Erie, Pa.	30.50
Indianapolis	29.75
Kearny, N. J.	30.00
Milwaukee	30.50
Montreal, Que.	31.00
Neville Island (Pittsburgh)	29.25
New England, deld.	31.55
Painesville, O.	30.50
Philadelphia	29.50
St. Louis	31.50
St. Paul	29.75
Swedeland, Pa.	29.50
Terre Haute, Ind.	29.75

PIG IRON

(Per gross ton f.o.b. furnace)

	No. 2 Foundry	Malleable
Birdsboro, Pa.	$65.00	$65.50
Birmingham	59.00	63.00
Buffalo	63.00	63.50
Chicago	63.00	63.00
Cleveland	63.00	63.00
Duluth	63.00	63.00
Erie, Pa.	63.00	63.00
Everett, Mass.	65.00	65.50
Fontana, Calif.	71.00	....
Geneva, Utah	63.00	....
Granite City, Ill.	64.90	65.40
Lone Star, Tex.	59.00	....
Neville Island (Pittsburgh)	63.00	63.00
Swedeland, Pa.	65.00	65.50
Toledo, O.	63.00	63.00
Troy, N. Y.	65.00	65.50
Youngstown, O.	....	63.00

NONFERROUS INGOT

(Cents per pound, carlots)

BRASS AND BRONZE: Red brass, No. 115, 31.50; tin bronze, No. 225, 40.50; No. 245, 35.00; high-leaded tin bronze, No. 305, 35.50; No. 1 yellow, No. 405, 25.75; manganese bronze, No. 421, 28.50.

ALUMINUM: 99 per cent plus primary ingots 27.10. Secondary No. 12 alloy 23.00-23.25. Deoxidizing grades: No. 1, 22.75; No. 4, 19.75.

MAGNESIUM: 99.8 per cent notched ingots 36.00, f.o.b. Velasco, Tex. (10,000 lb or more).

COPPER: Electrolytic 32.00, delivered Connecticut valley.

ZINC: High grade 14.85 delivered. Die casting alloy No. 3, 18.00, No. 2, 19.00, delivered.

IRON AND STEEL SCRAP

(Consumer prices per gross ton delivered, except as otherwise noted)

	No. 1 Heavy Melting Steel	No. 1 Cupola Cast	Heavy Breakable Cast	Clean Auto Cast	Machinery Cast	Malleable	Short Steel Rails
Birmingham	$43.00-44.00	**$51.00-52.00	....	....	....	....	66.00-67.00
Boston*	**47.00-48.00	**41.00-42.00	....	....	**44.00-45.00	....	....
Buffalo	53.00-54.00	**47.00-48.00	....	....	**53.00-54.00	....	67.00-68.00
Chicago	49.00-50.00	45.00-46.00	....	50.00-51.00	50.00-51.00	60.00-61.00	66.00-68.00
Cincinnati*	**48.50-49.50	**44.00-45.00	**44.00-45.00	....	**55.00-56.00	....	**73.00-74.00
Cleveland	51.00-52.00	53.00-54.00	42.00-43.00	52.00-53.00	55.00-56.00	61.00-62.00	76.00-78.00
Detroit*	**45.00-46.00	**51.00	**44.00	**55.00	....	**56.00	....
Los Angeles	55.00	**60.00	....	....	....	....	....
New York*	51.00-52.00	45.00-46.00	48.00-49.00	....	....	....	....
Philadelphia	56.00-58.00	51.00-53.00	57.00-59.00	....	58.00-59.00	66.00	80.00
Pittsburgh	53.00-54.00	50.00-51.00	48.00-49.00	....	58.00-59.00	....	70.00-72.00
St. Louis*	46.50	47.00	40.00	50.50	....	....	68.00
San Francisco	55.00	60.00	42.00	60.00	62.00	....	....
Seattle	53.00	54.00-56.00	48.00-50.00	....	....	....	....

*Brokers' buying prices. **F.o.b. shipping point

Get ALL THESE 12 ADVANTAGES IN ONE READY-TO-USE CORE PASTE

LYQUAGRIP*

1. Ready mixed, uniform at all times
2. Light colored, odorless, non-corrosive, non-fermenting
3. Dries rapidly at room temperatures
4. Unaffected by normal storage
5. Will not boil or blister
6. No appreciable gas generation
7. Pasted joints are stronger than core
8. Unaffected by mold humidity
9. For pasting CO^2 cores
10. Extra strong, uses 1/3 to 1/5 as much paste
11. Cores may be reheated without damaging pasted joints
12. Washes off hands and tools easily with warm water

*Trade Mark Reg.

Send for Literature

Whitehead Brothers COMPANY

Established 1841

NEW YORK OFFICE
324 West 23rd St., New York 11, N. Y.

NEW ENGLAND OFFICE
17 Exchange Place, Providence, R. I.

Manufacturers of

LYQUAFLOUR
For cleaner surfaces, better shakeout

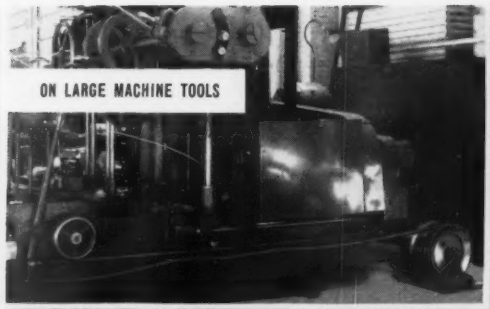
JOINT SEAL
Plastic compound for perfect sealing

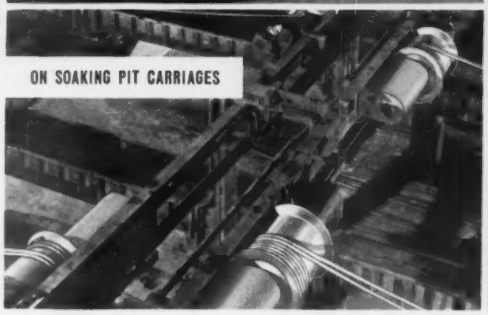
LYQUAFACE
The Liquid sand grain coating

DOB-IT
Ready-to-use core mudding compound

DUO RESIN
Binder for baking with controlled oven temperatures

Circle 580 on Inquiry Card—Page 225



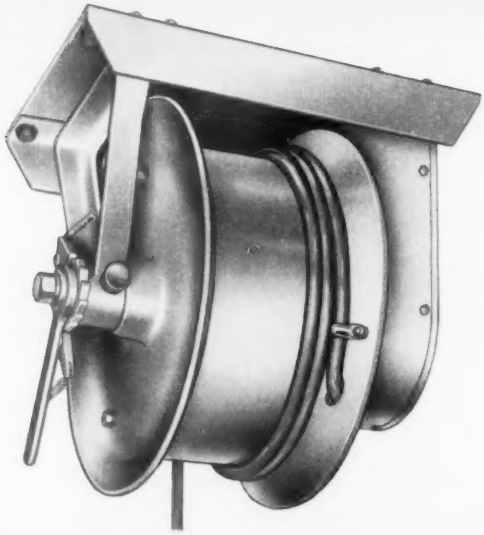


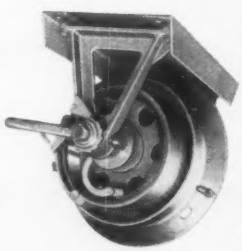
NO SPRING BREAKAGE...

IT'S A "Shaw-Box"® CABLE REEL

Spring breakage in a cable reel can create costly delays in handling and processing. Patented spring construction in the "Shaw-Box" Cable Reel eliminates spring breakage — assures performance you can bank on in the severest services. That is why so many magnet-equipped crawler cranes and overhead cranes have an automatic "Shaw-Box" Cable Reel to keep taut their flexible insulated conductor cables. Many more serve on soaking pit carriages and other machinery for the same reason.

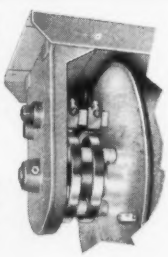
The "Shaw-Box" Cable Reel drum forms a water and grease tight compartment for the coil springs. Spring tension is easy to adjust *outside* the reel. Heavy-duty roller bearings assure smooth operation and minimize frictional wear. No complicated electrical maintenance. From every standpoint, "Shaw-Box" Cable Reels are tops in reliability and economy. They are available with 50 and 90 lbs. of pull and with cable capacities of 40, 60, 80, 100 and 120 feet. Get complete details. Write for Bulletin 368.





NO REVERSE BENDING of spring and consequent local crystalization. Spring breakage eliminated by patented design. Pull is constant. Ratchet lever simplifies spring tension adjustment to suit conditions.

MAINTENANCE IS EASY. Remove steel housing and entire heavy-duty collector ring, brush holder and brush assembly is exposed for inspection or servicing.



57M-1

MANNING, MAXWELL & MOORE, INC.

SHAW-BOX CRANE & HOIST DIVISION

386 West Broadway • Muskegon, Michigan

Builders of "SHAW-BOX" and 'LOAD LIFTER' Cranes, 'BUDGIT' and 'LOAD LIFTER' Hoists and other lifting specialties. Other Divisions produce 'ASHCROFT' Gauges, 'HANCOCK' Valves, 'CONSOLIDATED' Safety and Relief Valves, 'AMERICAN' and 'AMERICAN-MICROSEN' Industrial Instruments, and Aircraft Products.

In Canada: ***Manning, Maxwell & Moore of Canada, Ltd., Avenue Road, Galt, Ontario.***

Shooting Cores

with

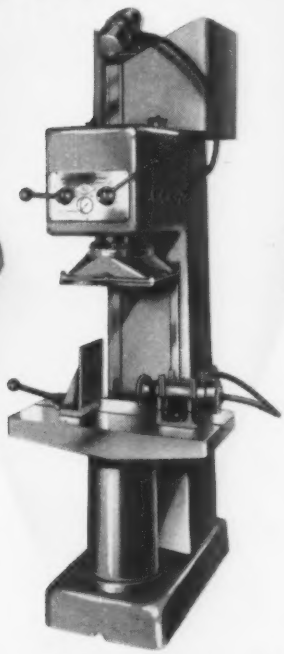
HANSBERG

DAVENPORT

SHOOTER

THE ORIGINAL SHOOTER DESIGNED TO BE A SHOOTER

Hansberg Shooters can shoot intricate, precision cores in less time, at a lower cost per core, because the sand is pushed into the cavity by air instead of being carried in with air. The sand absorbs the pressure shock and no air leaves the shooter with the sand.



All these cores were shot, one after another, using the same standard head.

At the International Foundry Exhibition, in Dusseldorf, Germany, this Hansberg Core-Making Machine was enthusiastically accepted. Its sales were greater than the combined sales of all competitive machines.

HANSBERG, THE ORIGINAL SHOOTER

There are no moving parts in the Shooter. Cores can be shot in wooden boxes without special attachments and without causing wear because there is no sand blasting action. Venting of boxes can be reduced to a minimum since the propelling air does not mix with the sand in the magazine. The only venting required is for the air in the box.

NO SIDE POST – The Hansberg Shooter has no side posts. It is open on three sides permitting conveyor operation. The height of the Shooter table is adjusted by finger-tip control due to the air-on-oil hydraulic feature, thus doing away with slow hand operated spindles and wheels. There are no spindles for the oil-pneumatic side clamps, and when not used they can be removed and put aside for further freedom of operation. These features increase production in any kind of a set-up.

A PATENTED FEATURE – Hansberg Shooter employs a large shoot valve entire'y surrounding the sand chamber which makes possible the heavier sands. This is a patented feature and cannot be copied to its full effectiveness.

ALMOST 4000 IN USE – Most Hansberg Shooters are used for the regular production of oil or green sand cores. However, the fact that the air does not mix with the sand makes the machine ideal to handle sands bonded with sodium silicate for the CO_2 process. Almost 4000 Hansberg Shooters are in use in the U.S.A. and Europe. They have been found to be practical also for making hollow shell-cores and shell-mo'ds. Thus, the Hansberg Shooter is the most universal machine in the foundry, being adaptabe for cores in any process.

FOUR STANDARD MODELS–Core weights: 4 lbs., 17 lbs., 42 lbs., and 88 lbs. Learn the difference between blowing and shooting. Write for further information.

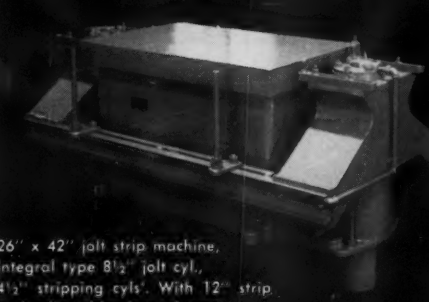
davenport MACHINE and FOUNDRY COMPANY
DAVENPORT, IOWA, U.S.A.

Circle 582 on Inquiry Card—Page 225

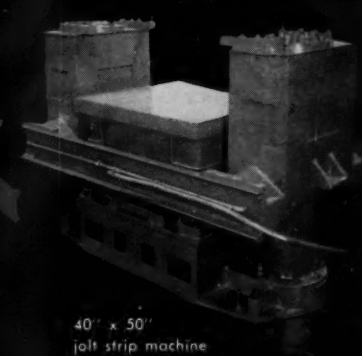
second of a series . . . . . the jolt strip machine

why foundrymen buy a HERMAN molding machine

26" x 42" jolt strip machine



26" x 42" jolt strip machine, integral type 8½" jolt cyl., 4½" stripping cyls'. With 12" strip and adjustable channel type stripping pins.



40" x 50" jolt strip machine

HERMAN PNEUMATIC MACHINE CO., UNION BANK BUILDING, PITTSBURGH 22, PA.

Here are only six of the seventy-eight different production models in the Herman Jolt Strip line. Each type is designed to fit a specific foundry requirement.

Short-run, jobbing work, for example, is just one of the many applications of these machines. With such a complete range of models foundrymen have found they can literally choose the jolt for the job.

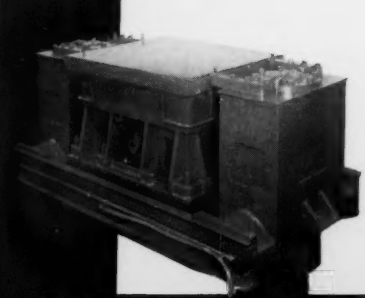
The Jolt Strip Machines are available with lifting capacities ranging from 600 pounds, 10 x 15 inch table to 73,000 pounds, 8 x 12 foot table. A Herman Direct Acting Vibrator can be furnished to insure complete separation of bond between sand and pattern during the stripping operation.

Smooth operation is assured by an air-on-oil hydraulic control principal. Speed is regulated by a built-in hydraulic control device.

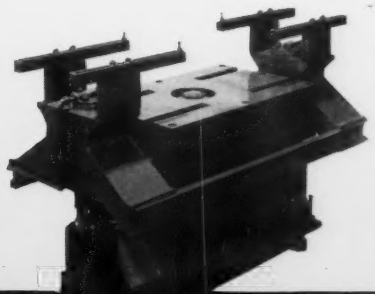
These and many other of the design and performance features of the Herman Jolt Strip Machines guarantee fast amortization. Their initial cost will come back to you in earnings many times over.

Write us today for details. We'll be glad to recommend the Herman Molding Machine best suited to your foundry operation.

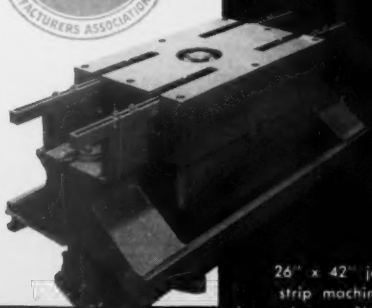
FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION INC. MEMBER FEMA



40" x 50" jolt strip machine, sub base type, 13" jolt cyl., 10" stripping cyls. with 20" strip.



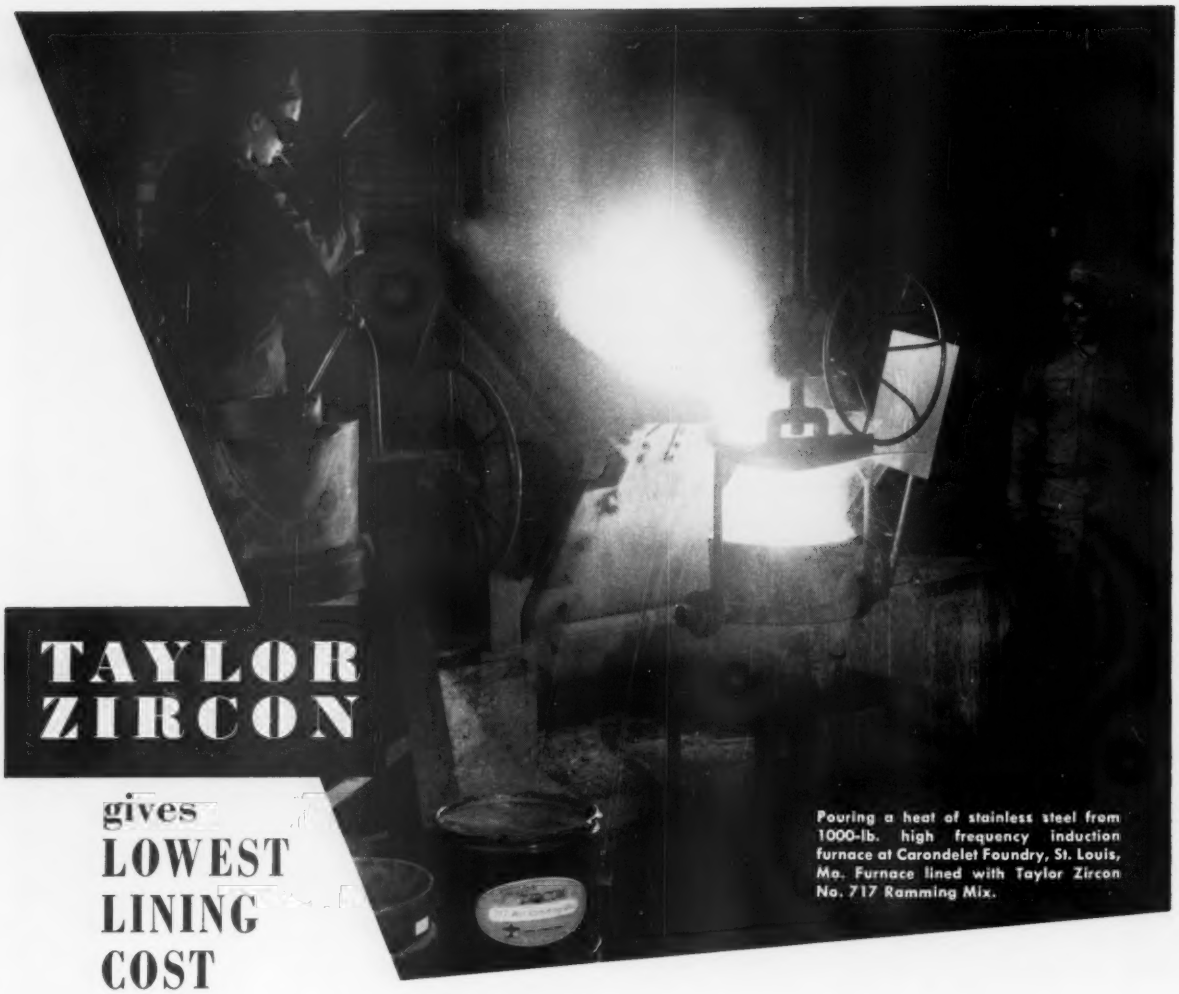
26" x 42" stool type jolt strip machine



26" x 42" jolt strip machine, integral type, 8½" jolt cyl., 4½" stripping cyls. with 12" strip. Direct acting vibrator and pattern stool.

HERMAN

Best Known Name in Molding Machines



Pouring a heat of stainless steel from 1000-lb. high frequency induction furnace at Carondelet Foundry, St. Louis, Mo. Furnace lined with Taylor Zircon No. 717 Ramming Mix.

TAYLOR ZIRCON gives LOWEST LINING COST *for induction furnaces at Carondelet Foundry*

Careful cost accounting at Carondelet Foundry, St. Louis, Mo., has shown Taylor Zircon No. 717 Ramming Mix to be the lowest cost lining for their two 1000-lb. high frequency induction melting furnaces . . . *less than ⅓ the cost* of previous lining materials used, as shown by their cost records, reproduced at left.

TYPE OF LINING	Magnesia-alumina-spinel	Taylor Zircon No. 717 Ramming Mix
Representative No. of Heats	56 62	306 342
Total Lbs. of Metal Melted	42,796 47,835	304,837 310,130
Average Lining Cost per pound of Metal	$0.00755	$0.00220

This foundry melts a wide variety of steels, principally nickel-chromium and straight chromium stainless. Pouring temperature is 3300° F. In addition to the cost advantage, Carondelet finds there is less slag build-up with Taylor Zircon and the lining is readily cleaned.

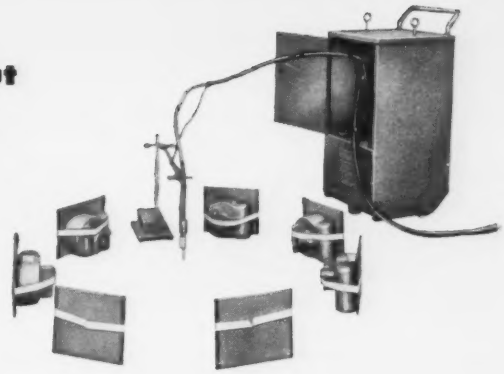
If your foundry melts similar stainless steel alloys, it will pay you to test Taylor Zircon linings. Write us, or contact the Taylor field engineer in your area for detailed information.

Exclusive Agents in Canada:
REFRACTORIES ENGINEERING AND SUPPLIES, LTD.
Hamilton and Montreal

The CHAS. TAYLOR SONS Co.
A SUBSIDIARY OF NATIONAL LEAD COMPANY
REFRACTORIES SINCE 1864 • CINCINNATI • OHIO • U.S.A.

some people have queer notions about

RADIOGRAPHY WITH ISOTOPES



Here's a typical multiple-specimen setup . . . seven castings radiographed simultaneously with a T.O. model 402 panoramic Cobalt 60 unit.

Many a plant, uneasily aware that it is missing the profits of radiographic inspection, still holds back for one mistaken "reason" or another. Here are some we run into . . .

"out of my league" . . . *costs too much*

Not so. An iridium 192 machine costing as little as $1700 may be fully adequate to your needs. *Indeed, average equipment cost is less than $2500.*

needs a *specialist* to run

On the contrary, a practical on-the-job training course in our Cleveland laboratory (free tuition to buyers) equips any intelligent employee with all he has to know.

takes forever to make a radiograph

Not so. You can x-ray 1" steel in 30 seconds, 3" sections in 4 minutes with the Cobalt 60 sources available today.

gamma radiographs are no good

Not so. If you use the right source for the right job you'll have no trouble getting the 2% detail sensitivity required by exacting inspection codes.

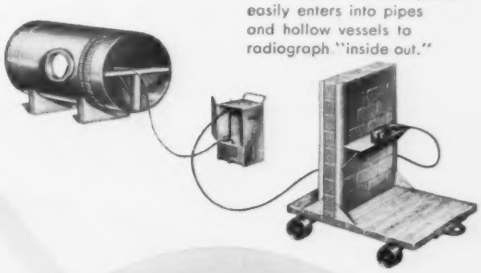
it's dangerous; we're afraid of it

No reason to be: Technical Operations modern equipment is safe and simple-to-handle.

not for me; my stuff is different

We don't know what *your* business is . . . but if *whatever* you make (or buy or sell) needs "seeing into" for quality control, radiography (either gamma or x-ray) can profit you as it does others — *your competitors included.*

The compact source capsule easily enters into pipes and hollow vessels to radiograph "inside out."



costs nothing to find out

what radiography can do for you. Simply call in your local Picker representative* or write us outlining your problem (and if possible, sending typical samples). We'll make tests and tell you frankly whether radiography holds any promise for you. Because Picker offers *both* x-ray and isotope equipment, we have no axe to grind for any particular method.

There's probably a Picker district office near you (see local 'phone book)

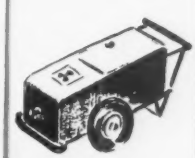
PICKER X-RAY CORPORATION
25 South Broadway, White Plains, N. Y.

SOME OF THE TECHNICAL OPERATIONS GAMMA RADIOGRAPHY UNITS MARKETED AND SERVICED BY PICKER X-RAY

TO412A
Iridium 192 Unit

TO402
Cobalt 60 Unit

TO404
Cobalt 60 Unit



TO446
Cobalt 60 Unit

TO405
Iridium 192 Unit

TO416
Source Changer

one stop for everything in Picker x-ray **radiography and fluoroscopy**

Circle 585 on Inquiry Card—Page 225

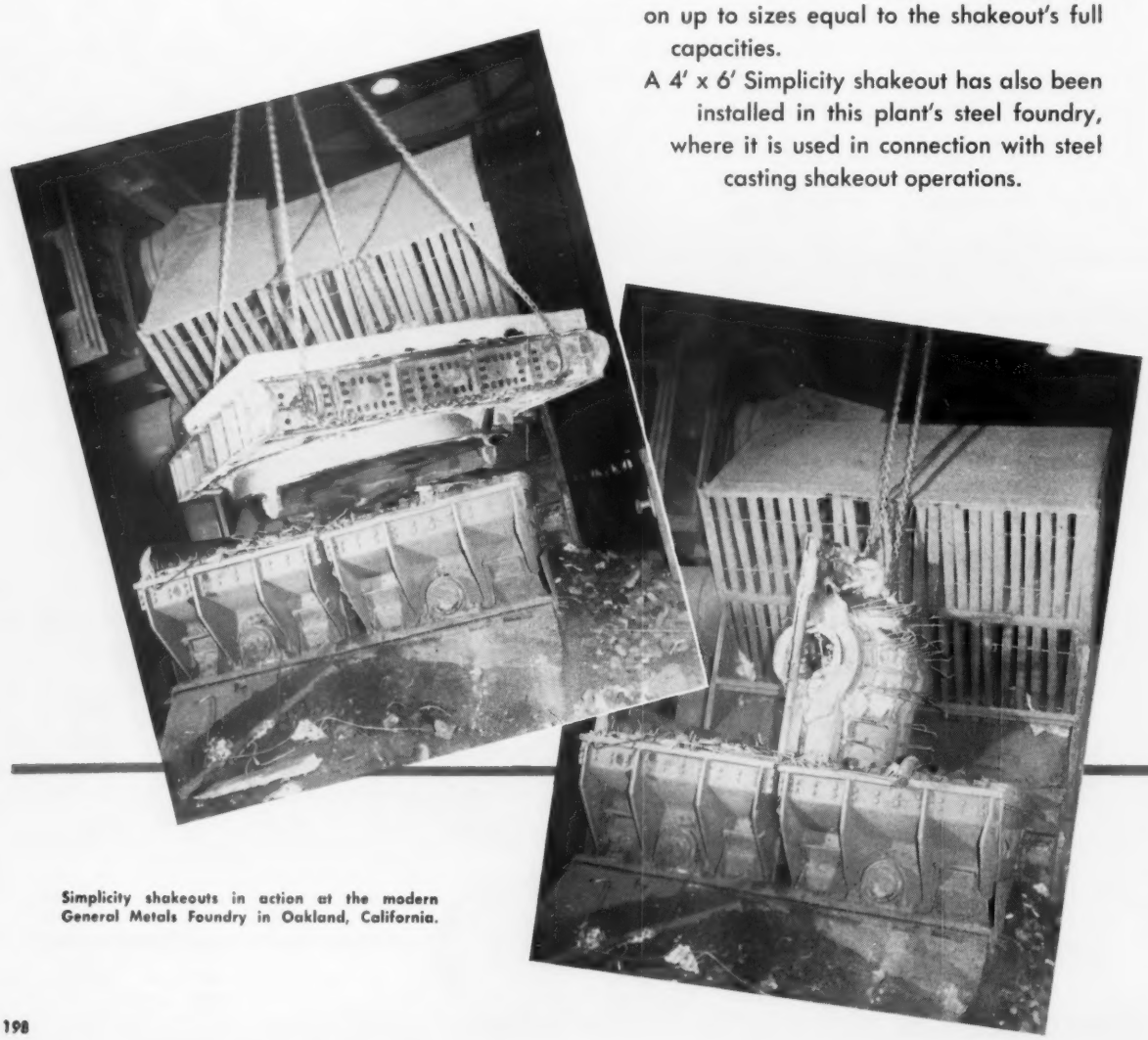
HERE'S HOW SIMPLICITY

boosting production at GENERAL METAL'S

Simplicity Engineering is proud that Simplicity machines are a part of General Metals' new $5 million plant. Both the iron and the steel foundries are using 8′ x 10′ Simplicity shakeouts, these units embodying dual Model DE 8′ x 5′s.

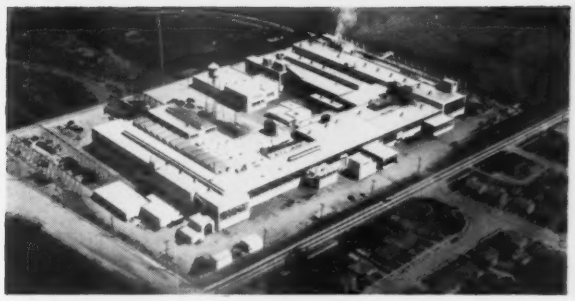
The size of castings put through the big shakeouts at General Metals range from 100 pounds on up to sizes equal to the shakeout's full capacities.

A 4′ x 6′ Simplicity shakeout has also been installed in this plant's steel foundry, where it is used in connection with steel casting shakeout operations.

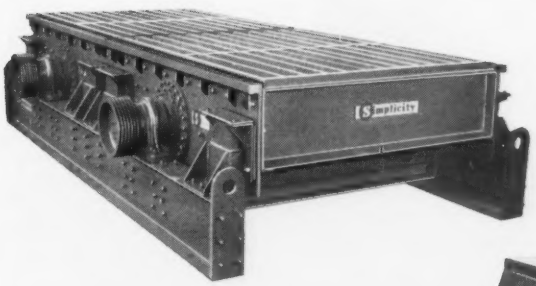


Simplicity shakeouts in action at the modern General Metals Foundry in Oakland, California.

SHAKEOUTS are new foundry

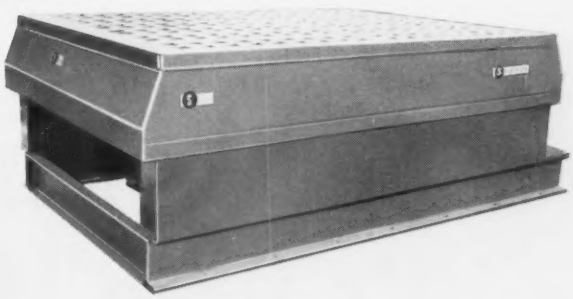


THERE IS A SIMPLICITY SHAKEOUT UNIT TO FIT YOUR PRODUCTION REQUIREMENTS:

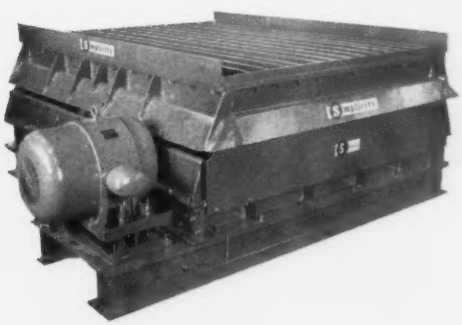


Simplicity shakeouts are available with three different assemblies, in many models and sizes. • The Gyrating shakeouts, as installed at General Metals, are the most versatile and widely accepted units of their type in the foundry industry. • The two bearing Simpli-Flo models have a "true circle" action similar to the Gyrating models, but eliminate the two main frame bearings—important where installation space is at a premium. • The double shaft, spring mounted OS-A-VEYOR shakeouts are excellent for the big jobs—the largest units capable of handling up to 200 tons.

Simplicity Gyrating Shakeouts, like this 5' x 13' dual, are standard equipment in foundries throughout the United States and Canada. Sizes from 2' x 3' x 12' x 16' are available.



The OS-A-VEYOR's VERTICAL ACTION produces fast shakeout without travel of castings or flasks off of the machine deck. This 7' x 8' Model OMA is an example of such a unit. Adjustment can be made for extremely high speed travel, where desired.



THE SIMPLI-FLO ACTION is highly effective and, at the same time, travels the castings and flask toward one end of the shakeout. For lighter jobbing work or production, this unit is especially recommended. The machine shown here, is an example of a shakeout, which embodies this type of action.

Write today for SIMPLICITY ENGINEERING catalog #F-7 "SIMPLICITY FOUNDRY EQUIPMENT" which describes these and many other SIMPLICITY machines which will help you speed your founding operations.

SALES REPRESENTATIVES IN ALL PARTS OF THE U.S.A.

FOR CANADA: Simplicity Materials Handling Limited, Guelph, Ontario.

FOR EXPORT: Brown and Sites, 50 Church St., New York 7, N. Y.

Simplicity
TRADE MARK REGISTERED

ENGINEERING COMPANY • DURAND 7, MICHIGAN

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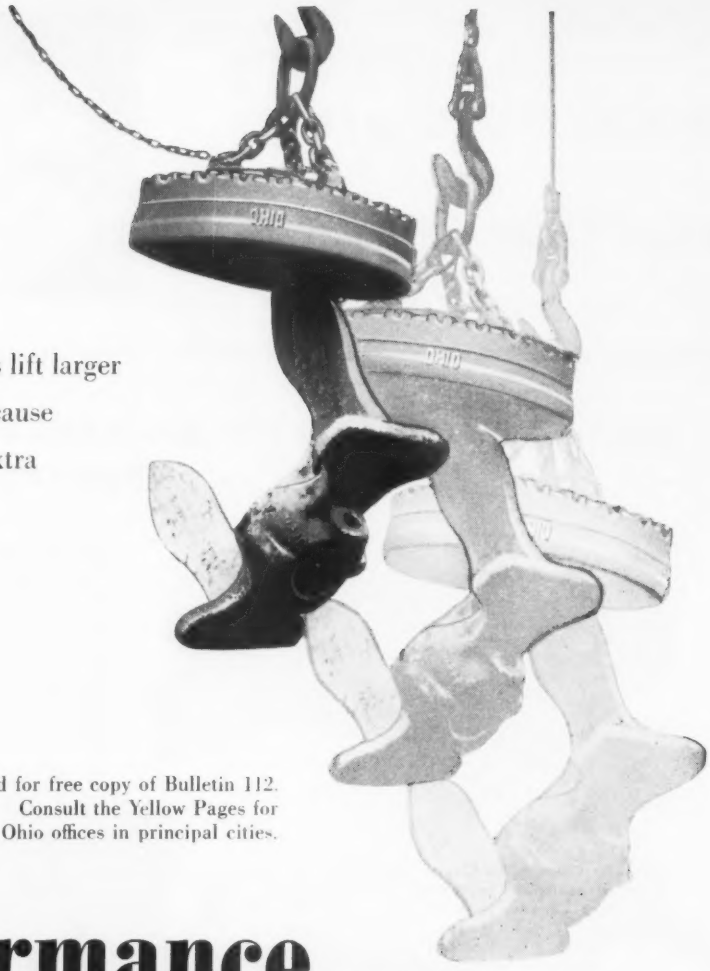


Size for size, Ohio Magnets lift larger loads over longer periods because they *operate cooler*. So for extra magnet lifting power, extra magnet value—always specify Ohio Magnets and Ohio Magnet Controllers. There's a type and size for every lifting job.

Send for free copy of Bulletin 112. Consult the Yellow Pages for Ohio offices in principal cities.

for performance . . . it's Ohio Magnets

Ohio Bolted Magnets 12″ to 65″ diameter. 6-coil types in 39″ to 65″; 8-coil in 55″ and 65″. Strap copper coils over 39″. Bolts protected in recessed wells. Also capsule coil over 45″.

Ohio Welded Magnets 39″ to 65″ diameter. Lightweight models in 39″ and 45″. 6-coil types in 46″, 55″, 65″; 8-coil in 55″ and 65″. Welded on top where it can't get dented in. Also capsule coil over 45″.

Ohio Basket Magnets 55″ and 65″ 4-coil, and 65″ 6-coil. For extra heavy-duty service; hefty ears project beyond magnet diameter, ward off damaging blows. No weight carried by bolts. Also capsule coil over 45″.

Ohio also makes Separation Magnets, Heavy-Duty Electric Hoists, Nail Making Machines, Fractional Horsepower, Shell and Torque Motors, Precision Threaded Parts for Aircraft Engine Manufacturers.

THE OHIO ELECTRIC MFG. CO.
5400 Dunham Rd., Maple Heights • Cleveland, Ohio

Ohio ELECTRIC

Chester Bland
President

WHEELABRATOR® STEEL SHOT

cuts abrasive costs for *ALL TYPES* of foundries

Mass Production Automotive Gray Iron Foundry

Saves $13,365 in 1 year!

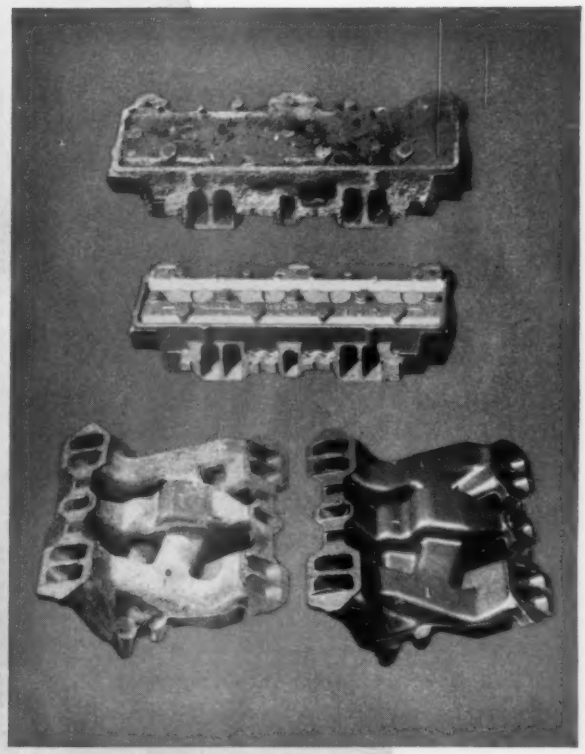
Wheelabrator Steel Shot's enviable success in solving cleaning problems is the reason why more than 1200 firms converted to this heat-treated, electric arc furnace steel shot within two years' time. Practically every conceivable cleaning problem was encountered within these plants. In every case Wheelabrator Steel Shot cut abrasive costs and provided other valuable benefits.

Typical of this success is the saving in abrasive cost experienced in a large, automotive gray iron foundry. By switching to Wheelabrator Steel Shot a 17.3c reduction on every ton of castings cleaned was effected. On the 309 tons of gray iron castings cleaned daily, this amounts to a daily saving of $53.46. Figuring 250 working days per year makes annual savings of $13,365, a 15.5% reduction in abrasive costs.

The resistance to breakdown, which is responsible for these savings with Wheelabrator Steel Shot, also results in a better product finish. As the cleaning room foreman points out, "Wheelabrator Steel Shot stays round longer instead of breaking down into fines. Because of this we get a better finish in a shorter period of time."

FOR MORE INFORMATION

on the many ways Wheelabrator Steel Shot can help you save, write today for Catalog 89-B.



WHEELABRATOR

CORPORATION

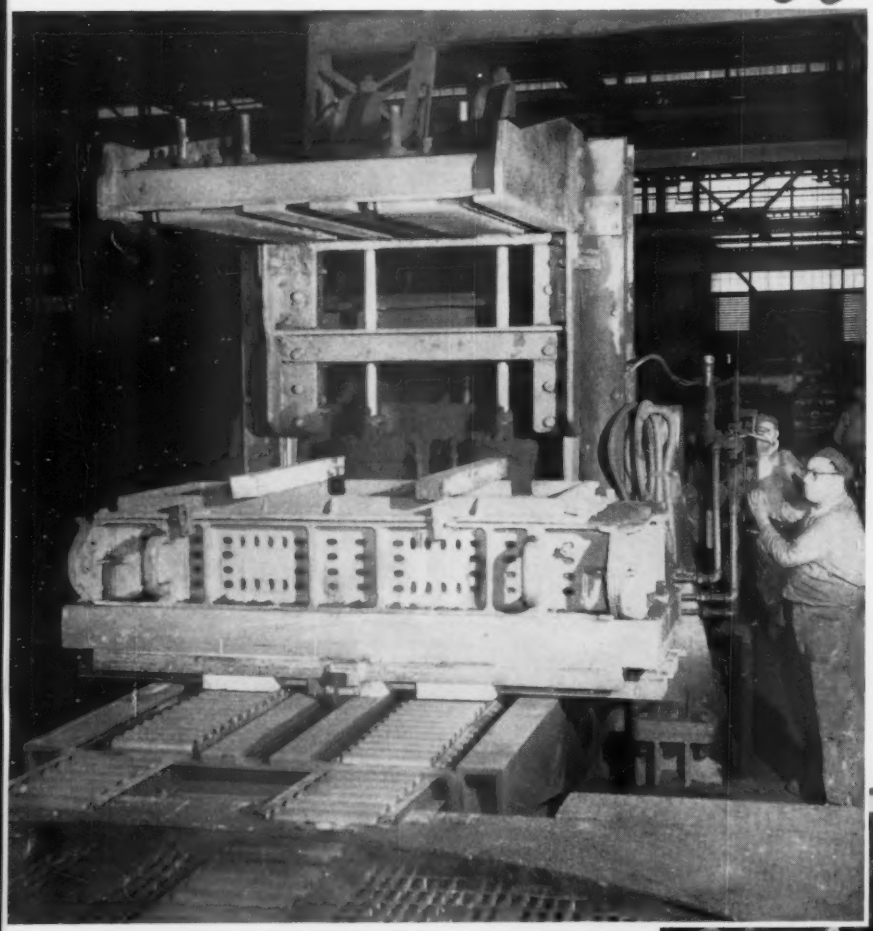
505 South Byrkit Street, Mishawaka, Indiana

World's Largest Manufacturer of Steel Abrasives

Circle 588 on Inquiry Card—Page 225

INTERNATIONAL MOLDING

Proven... Efficient...



A few of the many types of Internationals in the General Metals Foundry.

International has furnished General Metals Corp. with dozens of machines over the past years.

Machines include Core Blowers, Jolt Squeezers and Strippers, Jolt Rollovers and Rollover Draws.

Photographs show some of the equipment in operation at the General Metals Corp. plant.

The INTERNATIONAL LINE is designed by experienced foundry engineers who have a practical working knowledge of the problems of the industry.

INTERNATIONAL

AND CORE MAKING EQUIPMENT

Fast...Positive Action

INTERNATIONAL builds 110 different types of machines in more than 1400 different sizes, for every foundry need. Yet, if your particular problem requires special features, we will modify or build to your exact specifications.

Photos courtesy of General Metals Corp., Oakland, Cal.

One of the many Internationals in the General Metals Core Room.

"There's an INTERNATIONAL for EVERY type of job"

Circle 589 on Inquiry Card

MOLDING MACHINE CO.

LA GRANGE PARK, ILLINOIS

YOU'LL DO A BETTER JOB

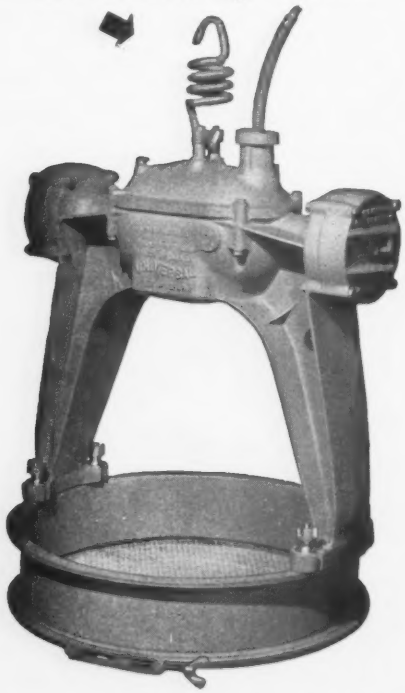
with **H. V. ADAMS DESIGNED**

HIGH EFFICIENCY FOUNDRY TOOLS

"UNIVERSAL FREE WHEELING"

FOUNDRY SAND RIDDLE

with the Double Eight Vibration

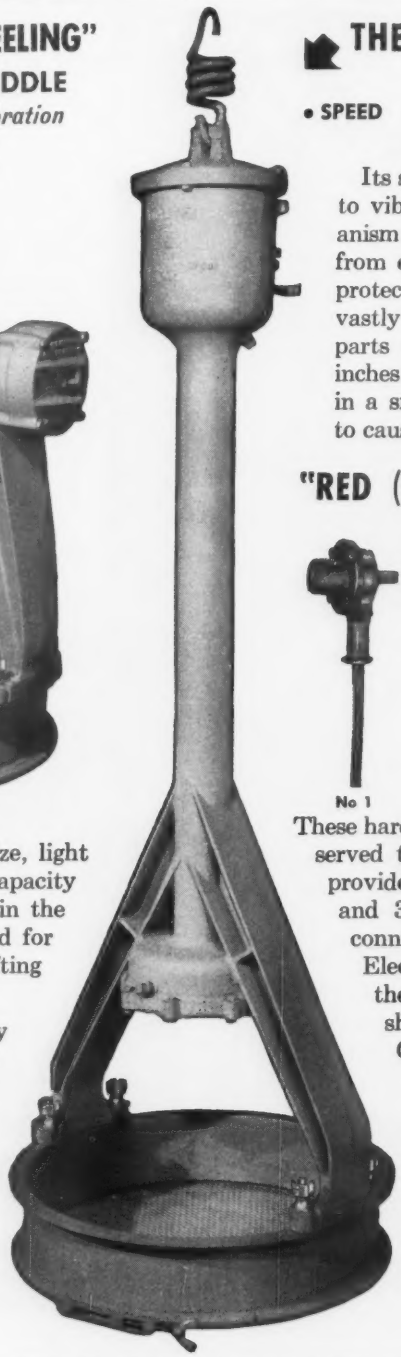


Because of its convenient size, light weight and good riddling capacity it long has been a favorite in the foundry. It also can be used for mixing core sand or for sifting sand directly into molds.

The mechanism is entirely enclosed protecting it from harmful dust and grit.

The main frame is cast in very strong tough aluminum.

It uses quick change ferruled sieves with 20 in. diameter sifting area. There are no loose wires to harm hands.



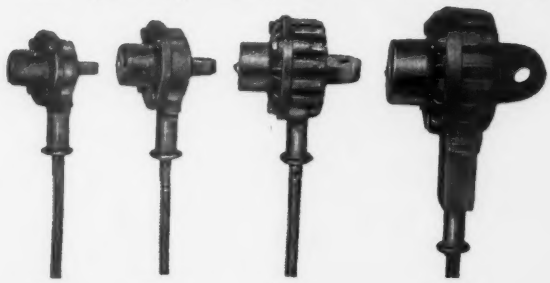
THE "ROTOPLANE" SPEED SIFTER

WILL GIVE YOU

• SPEED • ECONOMY • SAFETY • LONGER LIFE • GREATER SIFTING CAPACITY

Its sturdy one-piece frame and long shaft add to vibration effectiveness. The sealed-in mechanism assures protection of motor and bearings from exposure to dust and grit. This sealed in protection and "Rotoplane's" free-rotary action vastly increase bearing life. No exposed moving parts endanger the operator. Sieves have 20 inches diameter clear sifting area — are mounted in a smooth steel ferrule with no jagged edges to cause dangerous cuts and scratches.

"RED (Devil) ELECTRIC" VIBRATORS



No 1 No. 2 No. 5 No. 9

These hard hitting Adams designed Vibrators have served the foundries for over 30 years. They are provided with a 6 foot 3 wire authorized cable and 3 wire grounded connector which, when connected with our 3 wire grounded Red Electric Knee Switch, automatically grounds the vibrator protecting the worker from shock. The vibrators have passed the U. S. Government code inspection.

Other Foundry Products:

- **No. 11 NOISELESS TYPE VIBRATOR**
- **A-20 ELECTRIC VIBRATOR**
- **RED ELECTRIC KNEE SWITCHES**
- **"ROTO" ADJUSTABLE BIN VIBRATOR**
- **2 MIN. UNIVERSAL FINENESS TEST SIFTER.**
- **UNIVERSAL TRIPOD CARRIER**

ORDER ALL SIFTERS AND VIBRATORS WITH GROUND WIRE!!

FOUNDRY SUPPLIES MANUFACTURING CO., NOT INC.

2221 Orchard Street - Chicago 14, Illinois

Established 1918 **Cable Address: "Rotoplane Chicago"** **H. V. ADAMS, Mgr.**

Circle 590 on Inquiry Card—Page 225

Circle 591 on Inquiry Card→

a good turn

for large metal patterns

This big Bullard Turning Lathe is an unusual piece of equipment to be found in a pattern shop . . . its normal habitat is the production line where volume output offsets its investment. At City Pattern it is used to machine large metal patterns because it provides accuracy at maximum economy of time and money.

This is another indication of the unusual facilities to be found at City Pattern Foundry & Machine Co. for the crafting of the finest in metal patterns and other foundry equipment. Such facilities, manned by experienced hands, are your assurance that a pattern bearing this name has been produced accurately and by the most practical and economical modern methods. These "stand-out" facilities, coupled with conscientious effort to produce the best in patterns, are the very reasons that leading manufacturers rely on City Pattern Foundry & Machine Company for patterns that stand out in use.

City Pattern Foundry & Machine Company's Shrinkage Conversion Tables save time and eliminate errors in shrinkage calculations. Your letterhead request will bring a set of these handy tables without obligation.

Setting the Pattern in Patterns

CITY PATTERN

FOUNDRY AND MACHINE CO.

1161 HARPER AVENUE • DETROIT 11, MICHIGAN

*Oxygen-cutting is speeding metal-working throughout industry. Here a new manual LINDE blowpipe removes a giant riser fast and clean.

turn Problems into profits*

Oxygen-cutting blowpipes are cutting metals of all thicknesses, faster, and more economically than ever before. From one-of-a-kind jobs in small shops, to production line and foundry operations, new high production speeds and gas efficiency have made oxygen-cutting an almost indispensable tool to modern industry.

The new OXWELD C-63 blowpipe shown above is an example of the improved products which result from LINDE's constant research and development in oxygen-cutting. This manual heavy-duty blowpipe will remove even the heaviest risers quickly and smoothly.

For the answer to all your cutting needs—whatever they may be—see LINDE's complete line of oxygen cutting apparatus. Start saving now, contact your local representative today.

Linde Air Products Company

A Division of Union Carbide and Carbon Corporation

30 East 42nd Street UCC New York 17, N. Y.

Offices in Other Principal Cities

In Canada: LINDE AIR PRODUCTS COMPANY

Division of Union Carbide Canada Limited, Toronto

"Oxweld" and "Linde" are registered trade-marks of Union Carbide and Carbon Corporation.

Linde

Trade-Mark

Coming in May

A timely editorial report to foundrymen . . . .

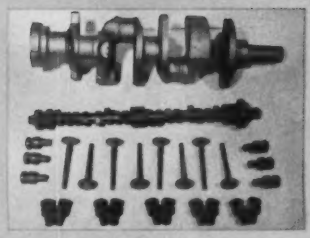
FOUNDRIES CAN SELL MORE CASTINGS

an "IDEA" article in five special sections

The editors of FOUNDRY announce plans for presentation of a thorough discussion of ways and means of selling more castings —a special editorial report being prepared for this year's May Pre-Convention issue. Attention will be given to foundry sales problems in five major areas.

1 MARKET POTENTIALS FOR CASTINGS

In which the editors will discuss and illustrate the long-term trends in market potentials for castings. More particularly they will point to areas where present opportunities occur.



2 HOW NEW TECHNICAL DEVELOPMENTS CAN BE USED TO BOOST CASTING SALES

A study of many new processes, materials and controls presently available for expanding the use and sale of castings.

3 HOW RESEARCH AND PRODUCT DEVELOPMENT CAN SELL CASTINGS

This feature will dramatize and explain ways in which foundrymen can recapture business lost to other fabricating methods and create new applications for castings through conversions.

4 HOW ONE FOUNDRY USED NEW METHODS TO INCREASE SALES

This will be an interesting case study of the manner in which one progressive foundry boosted sales through the aggressive use of new casting developments now available.

5 HOW TO BUILD A MARKETING PROGRAM

This will be a practical approach to the problem of gearing up for selling on a planned basis. It will have values for use by small, medium and large sized foundries.

Look for this special report in the FOUNDRY

MAY 1957 PRE-CONVENTION ISSUE

AFS CASTINGS CONGRESS
and 1st Engineered Castings Show
Cincinnati—May 6 to 10, 1957

61st CASTINGS CONGRESS

and

1st Engineered Castings Show

AMERICAN FOUNDRYMEN'S SOCIETY

Cincinnati, Ohio
May 6 to 10, 1957

FOUNDRY

MAY 1957 PRE-CONVENTION ISSUE

The May Pre-Convention issue of FOUNDRY will be mailed one week earlier than usual to reach foundrymen well in advance of the convention.

FOUNDRIES CAN SELL MORE CASTINGS

A Special Editorial "assist" in five helpful sections.

AFS CASTING CONGRESS

A description of the Technical Program, convention activities and planning for this year's AFS meeting.

FEATURE STORIES AND REGULAR DEPARTMENTS

Regularly scheduled features, Late News, Questions and Answers and other departments will appear as usual.

And in June

POST CONVENTION ISSUE . . . .

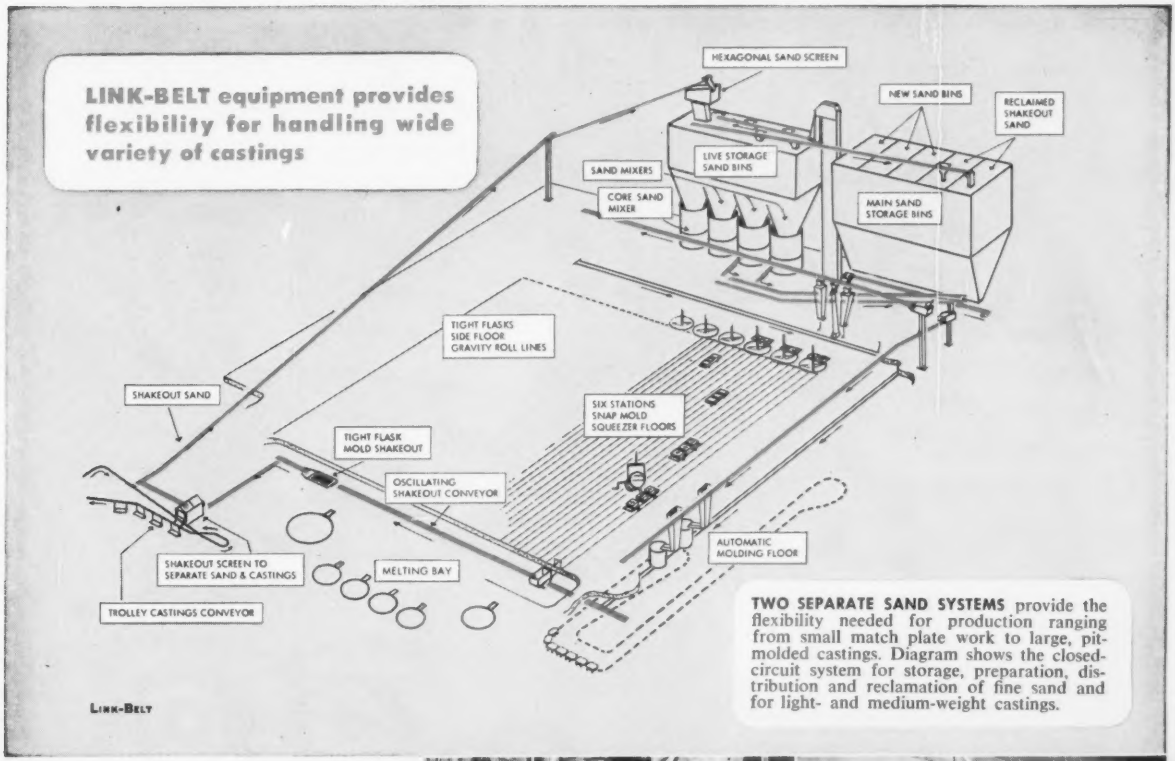
The news and picture story of the Cincinnati convention and technical sessions will be a special feature of the June Post-Convention issue of FOUNDRY.

FOUNDRY

A PENTON PUBLICATION · PENTON BUILDING · CLEVELAND 13, O.

General Metals jobbing foundry approaches

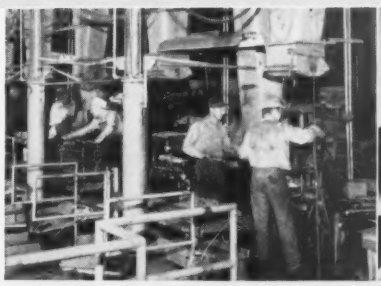
full mechanization



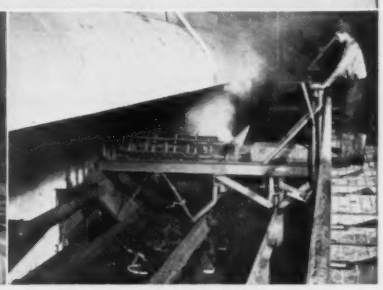
TWO SEPARATE SAND SYSTEMS provide the flexibility needed for production ranging from small match plate work to large, pit-molded castings. Diagram shows the closed-circuit system for storage, preparation, distribution and reclamation of fine sand and for light- and medium-weight castings.

THE variety of castings produced by job shops multiplies handling problems. But the Oakland (Calif.) plant of General Metals Corp. proves that mechanization is both possible and practical. Here Link-Belt equipment—including special machinery designed specifically for this installation—speeds production of castings ranging from one pound to seven tons. Other benefits include minimized manual handling, improved working conditions.

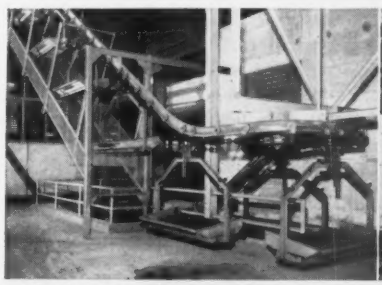
Link-Belt engineers can plan an entire conveying and sand preparation system for you . . . and follow through with a complete line of equipment to help you produce better castings at lower cost. For one machine or complete engineering, call your nearest Link-Belt office. For complete information, write for Book 2423. 14,207



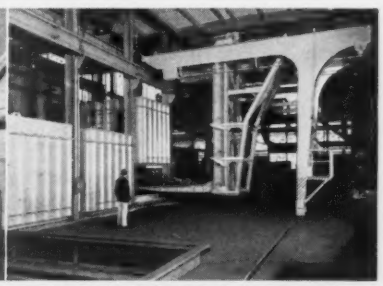
Molds are loaded onto cars, which are rotated 90 degrees on turntable and run off on tracks to pouring and storage line.



Semi-automatic device dumps sand and castings onto oscillating conveyor. Cars return by gravity to molding stations.



Castings drop from shakeout screen to trays of overhead trolley conveyor for delivery to cleaning bay.



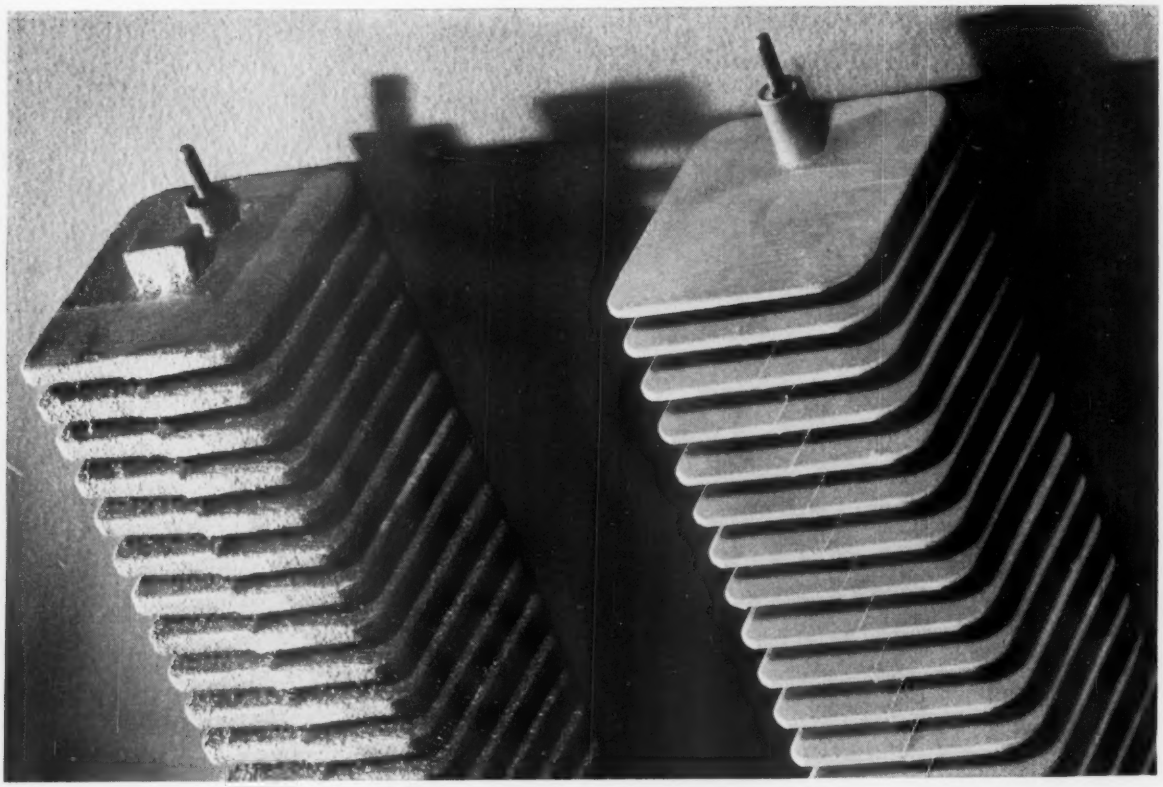
Unique Link-Belt "Manipulator" carries up to eight tons of castings to annealing ovens, quench tanks or storage.

LINK-BELT

CONVEYORS AND PREPARATION MACHINERY

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.

finer castings at lower cost



• **BEFORE:** 44" units cast in core sand cost 25% more to produce than shell molded castings.

• **AFTER:** Simpler foundry operation using Durez resin produces smoother, lighter, more efficient product.

. . . from shell molds bonded with **DUREZ RESINS**

THIS IS ANOTHER EXAMPLE of how quality and economy impossible to obtain with sand casting are achieved easily through improved shell molding techniques.

The simplified procedure made possible by Durez 18250 coating resin leads to increased production per man hour. Shells and cores bonded with this resin have outstanding hot and cold strength, permitting most economical sand-to-resin ratios. Having a very fast cure this resin speeds up production cycles.

The Lakeside Bronze Co., Buffalo, N. Y. profits also from other advantages of shell molding in producing these baseboard heating elements. The shell molded castings have a high quality appearance and are lighter in weight. The end result for the consumer is 15% greater heating efficiency. The pattern-like smoothness of the resultant castings is shown unretouched in the heating units illustrated.

"18250" is one of several Durez resins developed for producing shell molds and cores. Let us send you full information about them. Meanwhile, why not order a trial shipment today, and see for yourself how Durez 18250 cuts costly steps?

• • •

Our "Durez Guide to Resin Coated Sand" is an authoritative 16-page booklet covering simplified procedure, coating methods, solvents, test methods, etc. Ask us for your copy.

DUREZ®

Phenolic Resins that Fit the Job

DUREZ PLASTICS DIVISION

HOOKER ELECTROCHEMICAL COMPANY

1003 WALCK ROAD, NORTH TONAWANDA, N. Y.

HOOKER® CHEMICALS PLASTICS

Circle 594 on Inquiry Card—Page 225

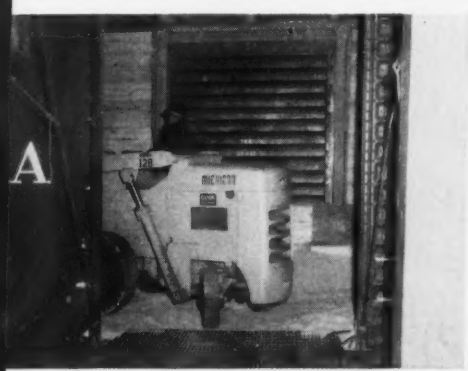
Power-shifting makes this tractor shovel (a Michigan)

faster and more maneuverable in boxcars

If you've ever tried to shift gears and turn a corner at the same time, you'll understand why the job-proved Michigan Model 12B is faster and more maneuverable in tight quarters. You don't have to stop to shift the Model 12B. Without taking your left hand from the wheel, you simply push the single power-shift lever to High, Low or Reverse. Clark's exclusive power-shift transmission and torque converter eliminate clutch pedal and engine clutch. You have no reaching, no gear clash, no hesitation. You save seconds, even minutes, on every cycle. And you eliminate downtime due to burned facings and other clutch troubles.

Dust protection

To cut downtime still further, oil bath air cleaner, filters and sealed assemblies protect the Model 12B against dust and dirt in every conceivable way. Take a first-hand look at this modern Tractor Shovel—clip the coupon to your letterhead and we'll arrange a demonstration in your own plant.



Fingertip steering, no-clutch direction changes, and full heaped loads help the Michigan Model 12B unload boxcars quickly. Standard bucket holds 16 cu ft, interchanges with 6, 10, 20 and 27 cu ft sizes, with lift fork, and tine bucket.

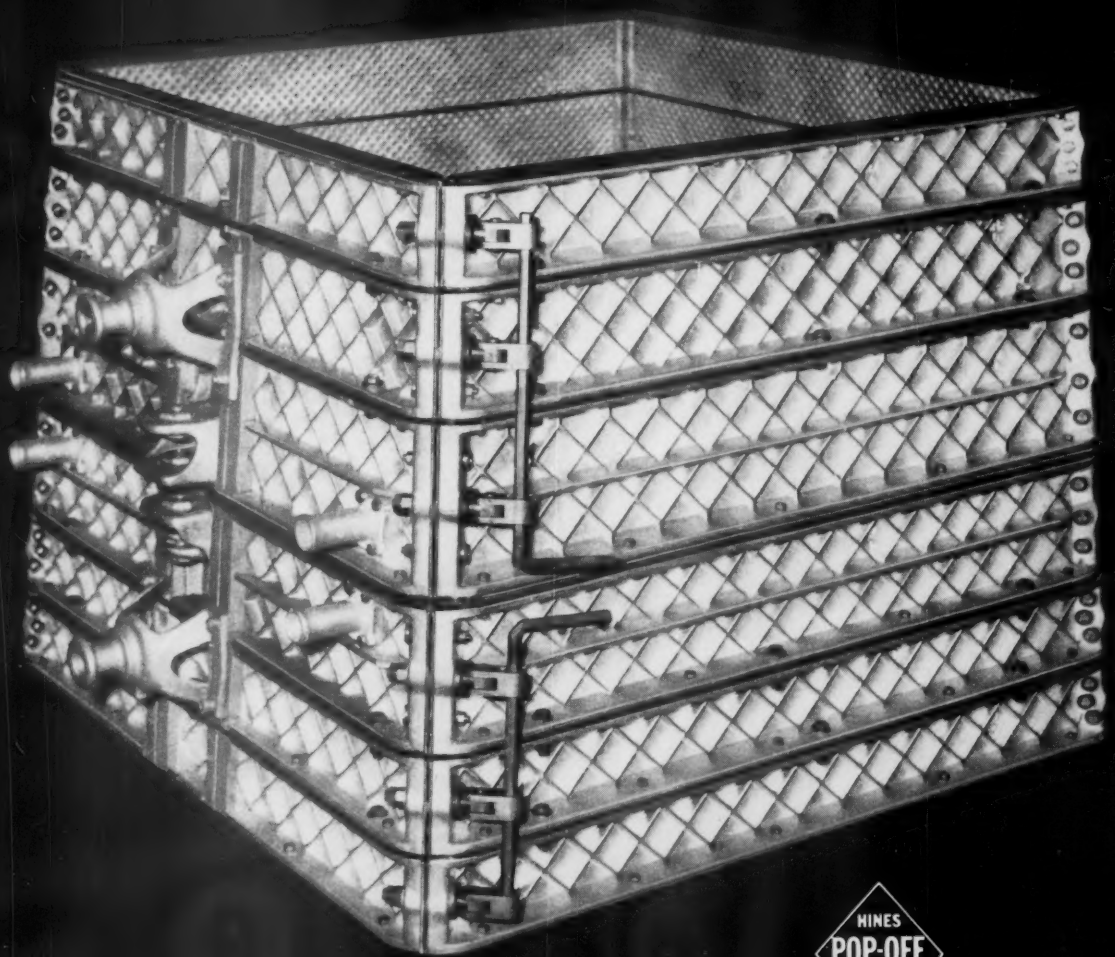
Available on Clark's no-down-payment Lease Plan; write for Data Sheet 111.

Michigan is a trade-mark of

CLARK® EQUIPMENT

Arrange demonstration of Model 12B:

CLARK EQUIPMENT COMPANY
Construction Machinery Division
2475 Pipestone Road
Benton Harbor 2, Michigan

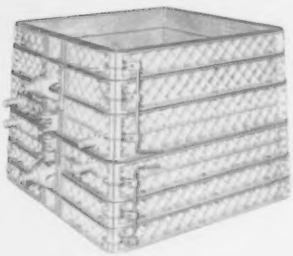


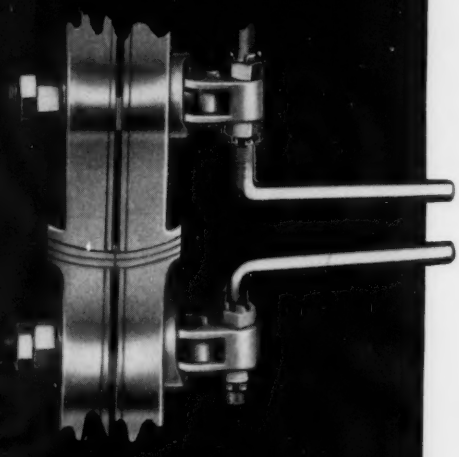
HINES POP-OFF FLASK

MEMBER FEMA

Heavy duty HINES "POP OFF" flask, 36" x 36" x 34" high. 7" cope, plus 5" upset, plus 4" upset. 6" drag, plus two 4" upsets. Equipped with trunnions and handles.

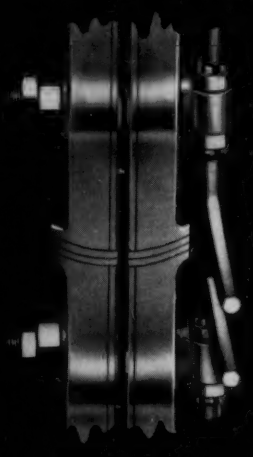
NEW HINES FLASK CUTS 12 OPERATIONS DOWN TO ONLY 2!





LOCKED POSITION

UNLOCKED POSITION



PATENTS PENDING

This heavy-duty HINES flask, equipped with the new "POP-OFF" locking mechanism, really cuts down on flask removal time! If fitted with old-style individual levers for each section, six operations would be required to open each corner—twelve operations in all. Now, to open each corner, it's only necessary to grasp the two handles together, turn them 45° and all six sections are unlocked simultaneously! Only two operations to open the entire flask, quickly and smoothly.

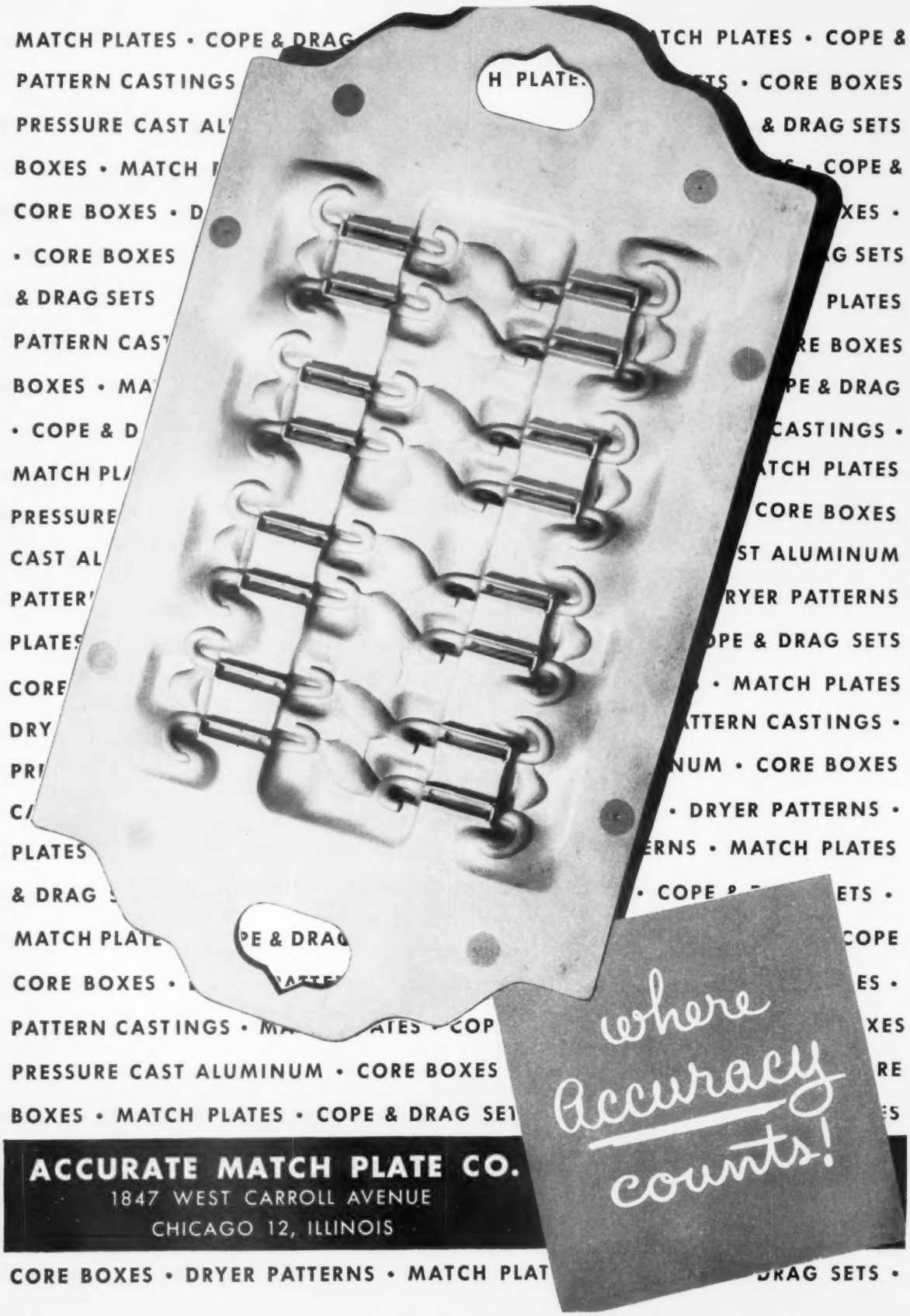
This exclusive locking mechanism is available on all HINES "POP-OFF" flasks, to speed up the opening of any required number of flask sections. It eliminates strain usually exerted on flask and pins when each section is opened separately. Adjustment is easier, too, as nuts and lock nuts merely need to be taken up, to compensate for wear. Replacement of parts, if ever necessary, is a very simple matter.

Next time you're ready to buy flasks, be sure to consider these new, faster-acting HINES "POP-OFF" flasks — for better molds and better castings.

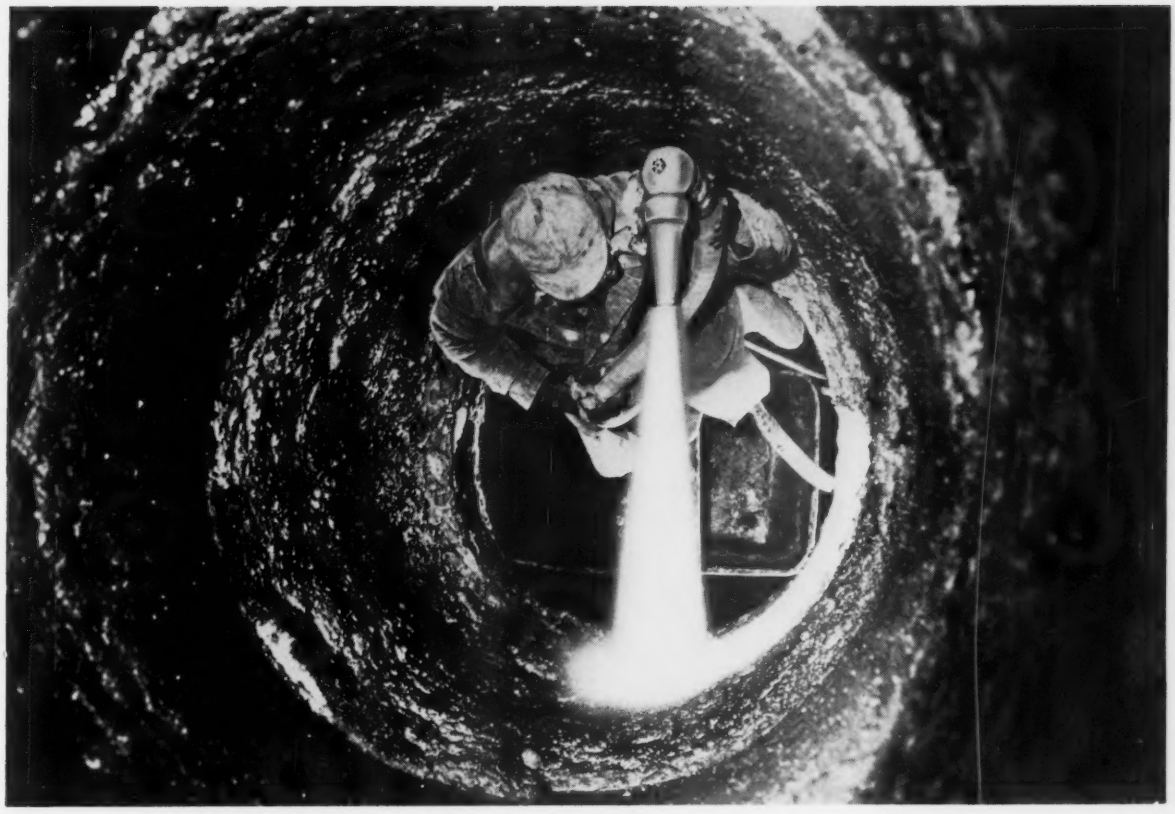
THE HINES FLASK CO.

3431 WEST 140TH STREET · CLEVELAND 11, OHIO

Circle 596 on Inquiry Card—Page 225



ACCURATE MATCH PLATE CO.
1847 WEST CARROLL AVENUE
CHICAGO 12, ILLINOIS



Gunning for savings with HARBISON-WALKER

KUPLOMIX

Substantial savings in cupola maintenance are assured by the use of H-W KUPLOMIX—a modern refractory which provides joint free linings. In the foundry it is also used to good advantage for the linings of ladles and troughs.

H-W KUPLOMIX is easy to apply either by air-placement guns or by ramming. It is exceedingly resistant to the impact and abrasion of the charge, the erosive action of molten metal and slags and to the chemical attack of slags.

H-W KUPLOMIX consists of grain-sized silica quartzite of unusual purity and a highly refractory bond clay which develops a strong ceramic set at furnace temperatures.

Please write for complete information about H-W KUPLOMIX, the modern service-proved cupola refractory.

Harbison-Walker Refractories Company

AND SUBSIDIARIES

World's Largest Producer of Refractories

GENERAL OFFICES **PITTSBURGH 22, PA.**

Circle 598 on Inquiry Card—Page 225

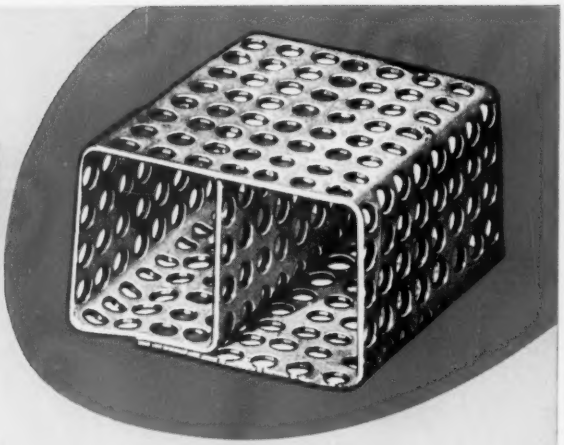
for light core castings

fine FANNER perforated chaplets

Provide

6 BIG

advantages



COMPLETE FUSION—Large number of perforations in light metal insure perfect fusion in light casting

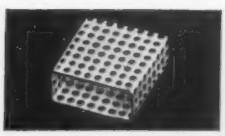
WILL NOT CHILL — Because of the large perforated area, there is no concentration of metal at any point to chill and cause leaks

PERFECT VENT — There are no gas or air pockets to cause "blow holes", so that perfect ventilation is assured

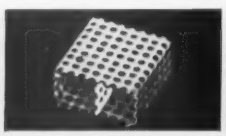
LARGE SUPPORT AREA — Widely distributed support area holds core more securely in place

FLEXIBLE SHAPE — Made in 10 styles in any shape or contour required, flat or curved to any radius, wedge-shaped, bridged or with extended ends

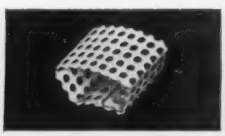
ACCURATELY MADE — Produced to exacting standards on specially designed machines to meet specifications



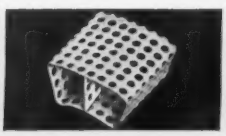
Style A



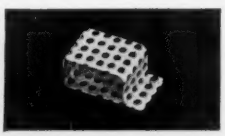
Style B



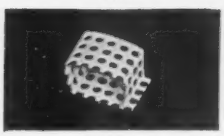
Style C



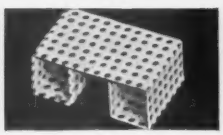
Style D



Style E



Style F



Style G

Style H

Style I

Style J

For light core work you can depend on Fine Fanner Perforated Chaplets to give you perfect core support and complete fusion. These versatile chaplets have the precise features for your particular job . . . the right shape, the right size, the right construction and the right material. They are made of tin coated sheet steel, aluminum, copper or brass Fine Fanner Perforated Chaplets are available in a large number of types, some of which are illustrated and in a wide range of thicknesses and sizes.

If you don't know all about the many advantages of Fine Fanner Perforated Chaplets . . . write for the Fanner Chaplet Catalog today!

Engineering Service . . .

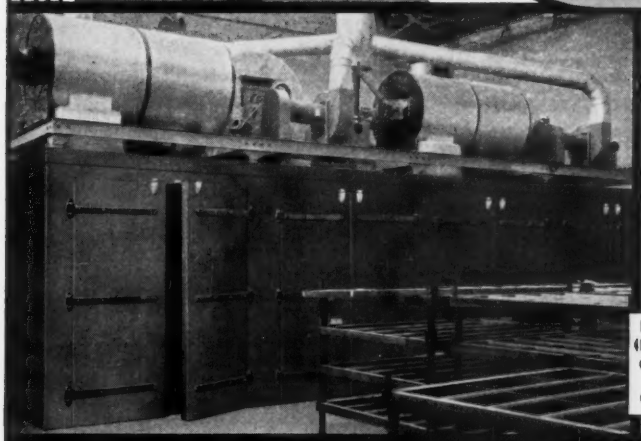
Qualified and specialized engineers in FANNER'S Technical Service Division are available for consultation, without obligation, or problems of producing more intricate castings; developing increased strength, closer tolerances, and better quality; reducing machining and improving finish — both in ferrous and non-ferrous castings. Take advantage of the research and development work that FANNER has invested in this field to improve your profit picture. Simply direct your request to the address shown below.

THE FANNER MANUFACTURING CO.

BROOKSIDE PARK CLEVELAND 9, OHIO

Designers and Manufacturers of Fine Fanner Chaplets and Chills

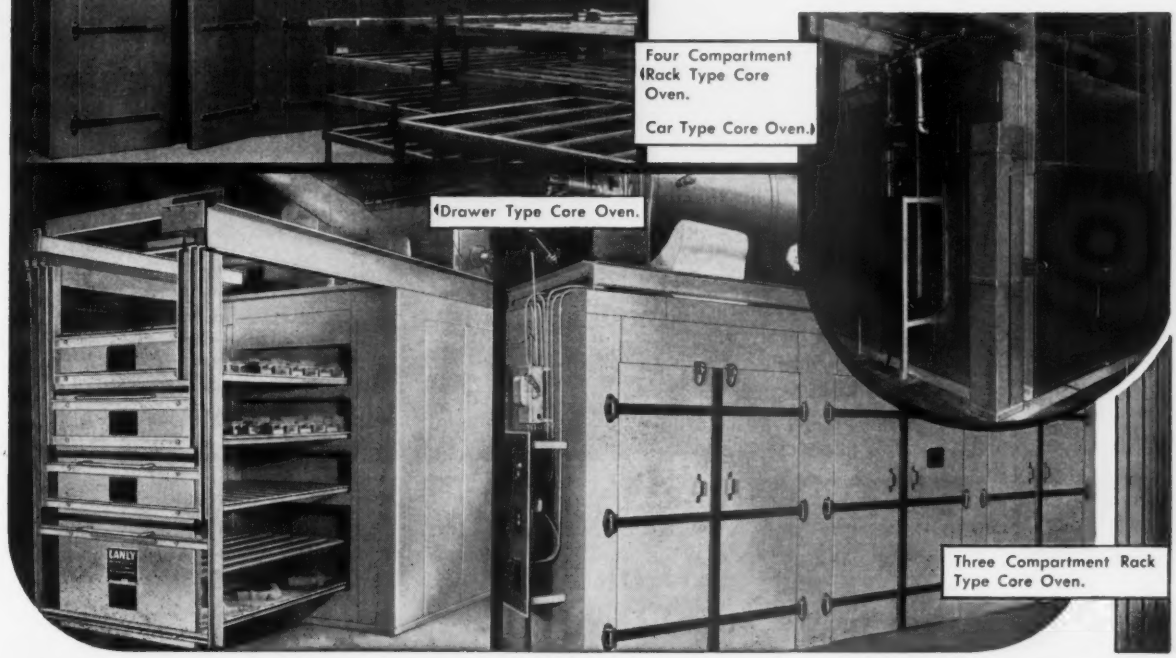
Two Compartment Car Type Mold Drying Oven.
Two Compartment Rack Type Core Oven.
Single Compartment Rack Type Core Oven.
LANLY
FOUNDRY OVENS
THE LANLY COMPANY • 780 PROSPECT AVE
CLEVELAND, OHIO



The Lanly reputation has been established as the result of the consistent incorporation of advanced, efficient design and high grade construction into every Lanly installation.

Core baking, pasting and mold drying ovens as well as casting conditioning and heat-treating ovens are available in standard units.

Write for Literature and Complete Information.



FOR CLEANER . . . SMOOTHER CASTINGS . . .
all the time

DELTA PYROKOAT-G WASH

Recommended For Use On Molds and Cores For Gray Iron and Non-Ferrous Castings.

DELTA PYROKOAT-S WASH

Recommended For Use On Molds and Cores For Steel and Malleable, also For All Types of Metals with the CO_2 Process.

Use DELTA | PYROKOAT-G PYROKOAT-S CORE & MOLD WASHES

Dip, brush, spray or swab PyroKoat wash uniformly . . . but sparingly . . . over the core and mold surfaces.

•

Air dry, ignite, torch or oven dry immediately. When dry, the surface coating of PyroKoat wash is high-refractory and waterproof.

•

Metal flows freely over the PyroKoat washed surfaces and castings are smoother, cleaner, free from flaws and imperfections.

•

Casting cleaning costs are reduced to a minimum. Production schedules are easier to maintain and foundry costs are reduced.

Delta PyroKoat washes are "protective" coatings for cores and molds. Casting surfaces are consistently better . . . smoother and cleaner. Scrap castings, due to core or mold surface ruptures or imperfections are almost entirely eliminated. Production schedules are easier to maintain and costs are frequently sharply reduced.

PyroKoat-S wash is used extensively on CO_2 Process cores and molds with all types of metals.

Delta PyroKoat-G and PyroKoat-S are alcohol-type washes that can be applied by brush, spray, swab or dip to cores and molds. Immediately after application, the wash should be ignited, torched or oven dried. It may also be allowed to air dry. When dry it forms a smooth, high-fusion, highly refractory, waterproof surface over which molten metal flows freely without disturbance or danger of contamination.

DELTA

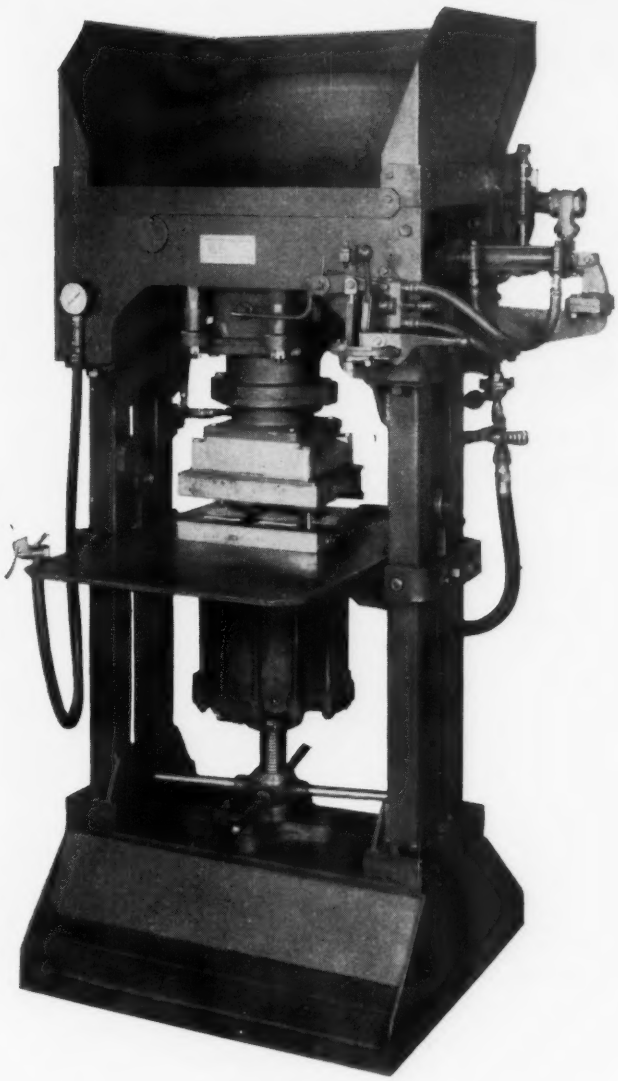
A working sample for test purposes will be sent to you at your request. Our representative will willingly cooperate and instruct in the proper use of the material to insure maximum effectiveness in use.

DELTA OIL PRODUCTS CO.

MANUFACTURERS OF SCIENTIFICALLY CONTROLLED FOUNDRY PRODUCTS

MILWAUKEE 9, WISCONSIN

Redford No. 4-D DRAW TYPE CORE BLOWER



Designed primarily to fill the need for a fast and flexible draw type machine to handle work from a few ounces to 10 lbs., the Redford #4-D can be quickly adjusted to accommodate core boxes not requiring the draw feature, or can be equipped with a clamp to handle vertically parted core boxes.

Rugged construction, simplicity of change-overs and a fast operating cycle make it suitable for either jobbing or high production work.

Exhaust air is utilized to thoroughly fluff the sand remaining in the sand magazine after each blow, thus reducing the possibility of cratering.

The stationary sand magazine and accurately guided draw table assure perfect drawing of the cores. Vibration of the core box is automatic.

Magazine heads normally furnished with the #2 Redford machine can be used with the #4-D Redford. Larger new type magazine heads especially suited for draw type work are also available as standard equipment.

Valves are designed to assure maximum safety. The operator must use both hands at the same time in order to clamp the core box.

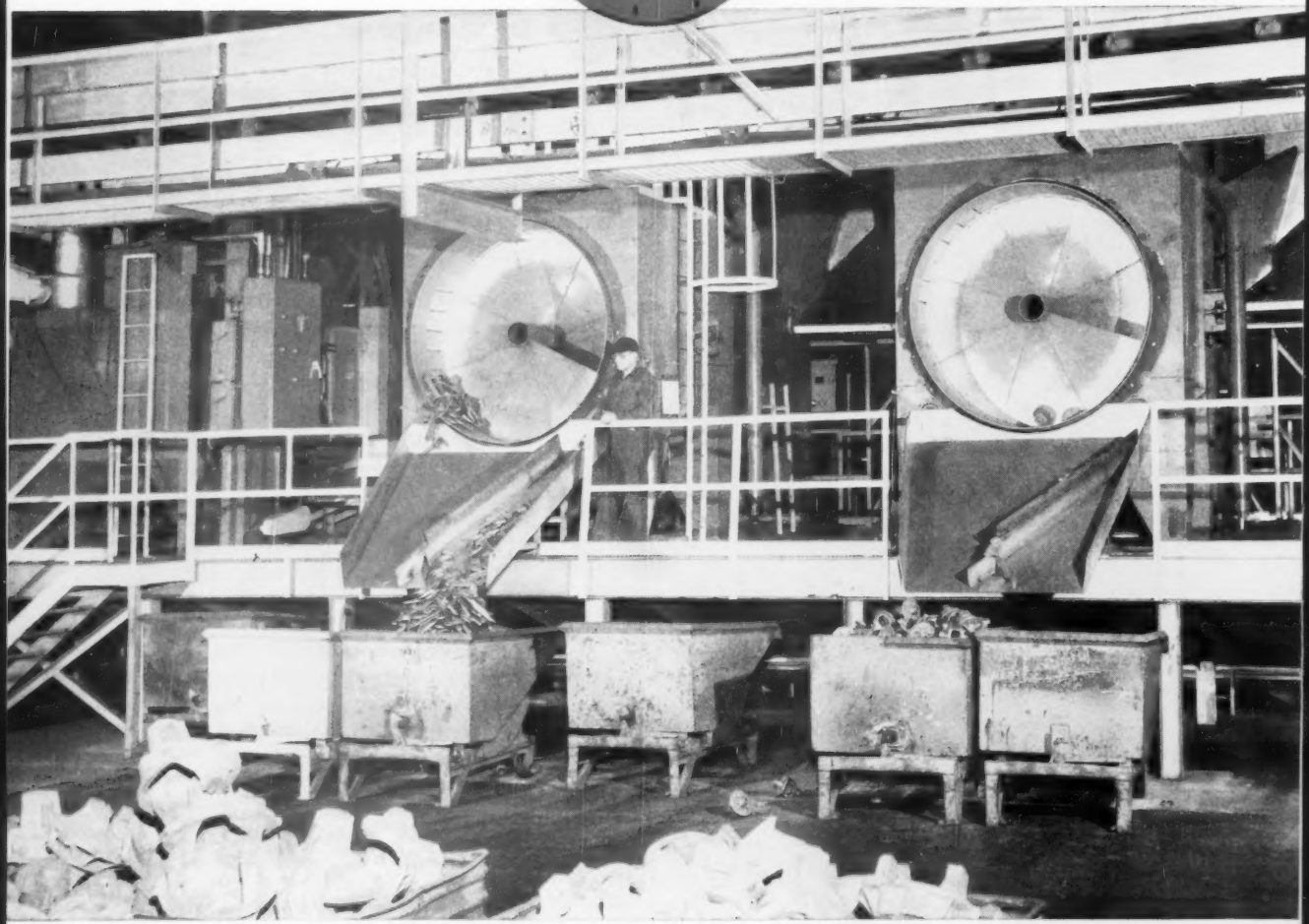
The Redford #4-D has been thoroughly proven in both small and large foundries. To get complete information write for Bulletin 4-D.

Redford IRON & EQUIPMENT CO.

20733 GLENDALE AVENUE • Phone KEnwood 1-8611 • DETROIT 23, MICHIGAN

Next Page Circle 603→

Put 60 working



How continous blast cleaning cuts production costs

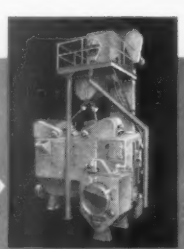
Increases Equipment Capacity
By eliminating time lost in loading and unloading, a Continuous Tumblast provides as much cleaning capacity as several batch type machines.

Reduces Equipment Cost
A single high capacity machine results in lower initial investment cost with reduced operating and maintenance expense.

Frees Floor Space
A Continuous Tumblast relieves crowded working areas in plants where floor space is limited.

Saves Man Hours
Conveyorized loading and unloading along with continuous uninterrupted cleaning production eliminates all manual handling of work.

Fits into Production Line Operations
Maintaining a steady, uniform flow of work, a Continuous Tumblast is easily integrated into existing production line or enables a high degree of automation.



60"
CONTINUOUS TUMBLAST

minutes in every hour

with Wheelabrator Continuous Tumblast

no time out for loading or unloading

Non-stop operation of Wheelabrator Continuous Tumblasts makes every minute count in meeting the heavy demands of high production casting cleaning. Eliminating the time normally required for loading and unloading, these high-volume machines put 60 productive minutes into every hour.

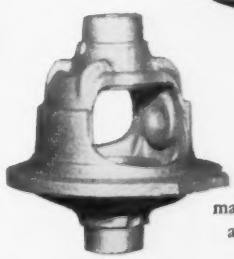
A Michigan automotive foundry, for example, cleans approximately 10 tons of malleable and pearlitic malleable castings (with difficult-to-remove scale) hourly in each of the two Continuous Tumblasts illustrated on the opposite page. In this setup, castings enter one end of the machine, go straight through the blasting chamber to be discharged at the other end into a tote box loading hopper. No manual labor is required to operate either machine.

Even greater production is attained in a similar installation at another mass-production foundry cleaning grey iron. A cleaning rate of 13 tons hourly is maintained — all loading and unloading operations are conveyorized making cleaning completely automatic. In an average 16-hour day, more than 208 tons are cleaned. Typical parts included in this production are illustrated below.

malleable casting before cleaning

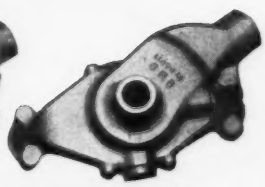
grey iron casting before cleaning

grey iron casting before cleaning



malleable casting after cleaning

grey iron casting before cleaning



grey iron casting after cleaning

grey iron casting after cleaning

grey iron casting after cleaning

WHEELABRATOR

CORPORATION

505 S. Byrkit Street — Mishawaka, Indiana

Send today for literature that has detailed information on Continuous Tumblast equipment.

99.9% PURE SILICA
WEDRON
SILICA COMPANY
INDUSTRIAL SAND

This extensive deposit plus scientific processing assure you the finest rounded grain pure silica sand for foundry use

24 standard grades in regular production

The chances are better than ever that your foundry operations now require high quality, more exact sand grades than they used to. With the new casting methods now used, sand is critical. It has to be pure, uniform and of a certain exact grade.

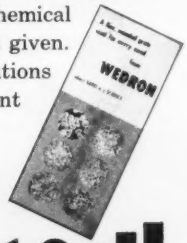
This close control of sand quality is only possible in a scientific sand processing plant such as Wedron's. Every step in the process is controlled to give users consistently high quality sand with these facilities. Wedron regularly produces 24 separate grades of sand as standard. From these grades it is possible for most users to choose a sand which will meet most any requirement. Where necessary, Wedron can produce special sand grades to customer specifications. A considerable amount of our regular production is in these special grades.

The Wedron sand deposit itself has special plus values for foundry users. Wedron sand is a pure, rounded grain silica with high heat and chemical resistance. It is highly desirable for foundries because it greatly reduces cutting out of core boxes and produces a smoother casting surface, grade for grade.

In many ways, Wedron is your best bet for foundry sand. Make your next order Wedron . . . for the best foundry sand available.

NEW SAND BOOKLET

This new booklet gives all the details on Wedron Sands for all kinds of industrial uses. Complete descriptive folder details the Wedron processing operations which produce the finest rounded grain silica sands. 24 separate standard grades are tabulated and chemical analysis of sand is given. Numerous illustrations of the Wedron plant and facilities are shown. Send for your copy today!



WEDRON

MINES AND MILLS IN THE OTTAWA-WEDRON DISTRICT

WEDRON SILICA COMPANY

135 South LaSalle Street, Chicago 3, Illinois

Circle 604 on Inquiry Card—Page 225

Switch to this new General Electric

WHITE MERCURY LAMP

YOU can use the new General Electric *White Mercury* Reflector Lamps *in your present 400-watt mercury equipment* with no change or added investment in operating equipment.

1 GET UP TO 63% MORE LIGHT ON WORK FROM YOUR PRESENT FIXTURES: Because a brand new phosphor generates more white light than ever before you get from 7% to 63% more light on the work, depending upon the lamp type you are replacing. (See below).

2 GET UP TO 33% LOWER COST OF LIGHT IN YOUR EXISTING INSTALLATIONS: With this increased efficiency your unit cost of light can go down from 7% to 33%. (See below)!

3 GET LOWER INITIAL COST FOR NEW INSTALLATIONS: You can get *more* light from the same number of fixtures, or get *equal* light with up to *⅓ fewer* fixtures!

You get all this with new General Electric *White Mercury* Reflector Lamps because of a specially designed strontium magnesium orthophosphate phosphor. This phosphor converts ultra-violet radiation into more white light than ever possible before. It's also an efficient reflector—sealed in against dirt and fumes.

Gain these advantages *now*. Replace your present mercury lamps with the new G-E H400 RW-1. Also available in the bulged tubular shape, the H400 EW-1. For more information write: General Electric Large Lamp Dept. F-3, Nela Park, Cleveland 12, Ohio.

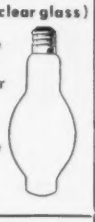
ADVANTAGES OF NEW G-E *WHITE MERCURY* OVER OTHER G-E 400-WATT MERCURY LAMPS

NEW RW-1 vs A-1 (clear glass)

- 55% to 63% more light to the work
- 27% to 33% lower cost of light
- Less maintenance
- Whiter "Color"

NEW RW-1 vs E-1 (clear glass)

- 28% to 31% more light to the work
- 16% to 23% lower cost of light
- Less maintenance
- Well suited for use in upward light fixtures
- Whiter "Color"



NEW RW-1 vs J1 (color improved)

- 37% to 40% more light on the work
- 24% to 30% lower cost of light
- Less color improvement

NEW RW-1 vs RC1 and R1 (reflector shape)

- About 7% more light on the work
- 7% lower cost of light
- Less color improvement for RC-1 users

Progress Is Our Most Important Product

GENERAL ELECTRIC

Circle 605 on Inquiry Card—Page 225

You wouldn't tolerate low voltage, but—

Do you have Full Air Pressure?

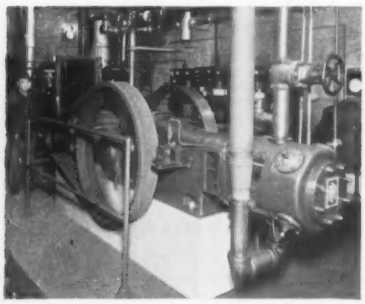
Every pound below design pressure drops air tool performance nearly 2%

Keep production going...use Ingersoll-Rand air tools and keep pressure up with Ingersoll-Rand compressors.

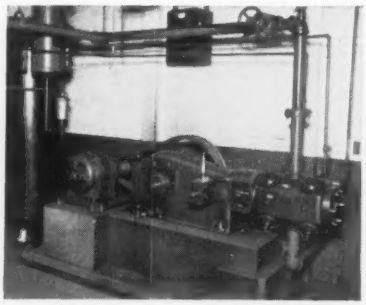
Perhaps an Ingersoll-Rand ES Compressor will build your Air Power System to full capacity

Modern, time-saving, labor-aiding air tools are designed to operate at a working pressure of 90 pounds. As the pressure falls off, so does the performance of the tool. Studies have shown that by increasing air pressure *at the tool* from 70 psi to 90 psi, you can increase the available power of the average air tool by 37%. This means a big increase in productivity—big savings in time and cost.

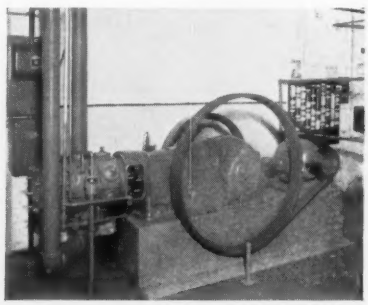
If your increased usage of compressed air has outstripped compressor capacity, an additional heavy-duty ES compressor will be a highly profitable investment. Your Ingersoll-Rand representative will be glad to help you make an air survey and recommend the most economical solution to the problem.



This Class ES compressor provides 100 psi air for operating air tools in the foundry and machine shop of a large manufacturing company.



For more than 15 years, this ES compressor has been providing a dependable supply of air at 100 psi for general plant service in an Eastern metal products factory.



Air tools used in a large woodworking plant are operated at top efficiency by the heavy-duty ES compressor shown above, delivering air at 100 psi.

Only I-R compressors have CHANNEL VALVES

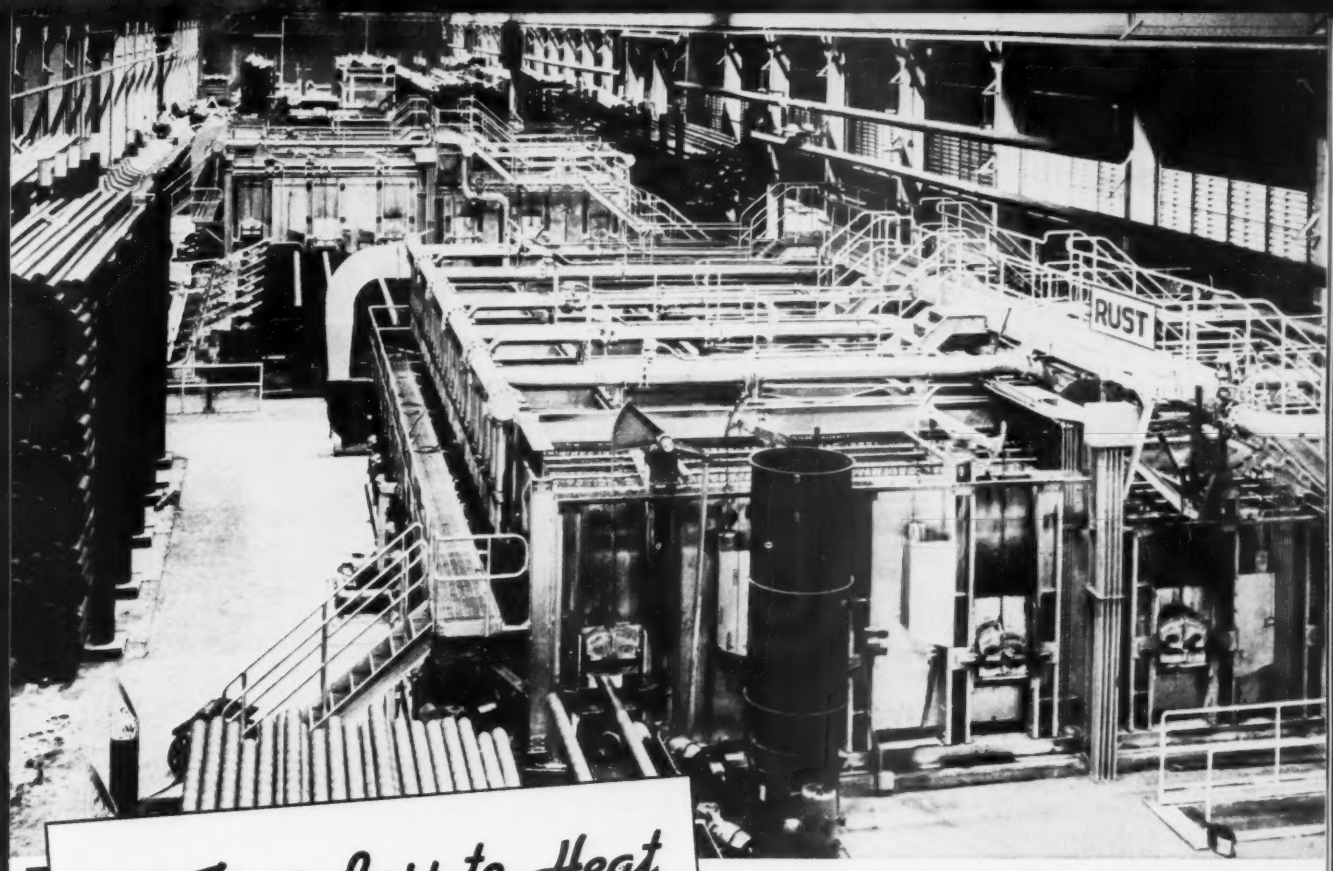
Known for high efficiency, quiet operation and durability. Entirely different. Each valve is a combination of rigid stainless-steel channels and leaf springs, with trapped-air spaces which cushion action.

Ingersoll-Rand

I-439

11 Broadway, New York 4, N. Y.

COMPRESSORS • GAS AND DIESEL ENGINES • ROCK DRILLS • PUMPS • TURBO-BLOWERS • AIR AND ELECTRIC TOOLS



116 Tons Less to Heat in this roof

because of B&W Insulating Firebrick suspended construction

Here's another case where light weight means lower cost. The roof of this walking beam furnace is 2,320 square feet. B&W Insulating Firebrick suspended construction for a 9-inch roof weighs about 30 lbs per square foot, including the weight of rods, hangers, pipe, brick and mortar. This is approximately 100 lbs per square foot less than an arch constructed of heavy firebrick plus insulation having the same heat flow. *This saving means the B&W IFB roof is 116 tons lighter.*

The new walking beam furnace (shown in photograph above) was designed and constructed by Rust Furnace Company for Jones & Laughlin Steel Corporation. Seamless pipe is conveyed into the furnace, moves slowly from left to right on walking beam rails designed and furnished by York-Gillespie Mfg. Co., and passes out the exit door.

Here are the money-saving benefits of B&W suspended construction:

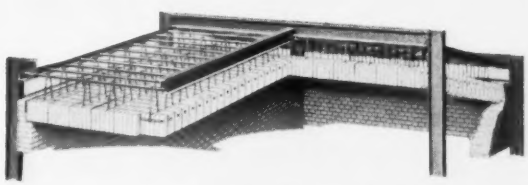
1. Supporting steel is less massive, far less costly. Commercial size steel can be used for roof suspension instead of special castings.

2. B&W Insulating Firebrick heat up and cool down faster. This means lower fuel costs, faster inspection.

3. Furnace temperatures can be changed quickly. When different steels call for different heating schedules, the furnace temperature can be adjusted in minutes instead of hours.

4. Installation costs are lower because these lightweight brick can be handled faster and easier than ordinary heavy firebrick.

For complete information on B&W IFB—the *lightest* weight insulating firebrick, write to B&W today or call your local Refractories Engineer.



This is a cross-sectional drawing of a typical suspended arch arrangement using B&W Insulating Firebrick. It can be used in flat or sloping roofs, nose arches and many other types of suspended furnace construction.

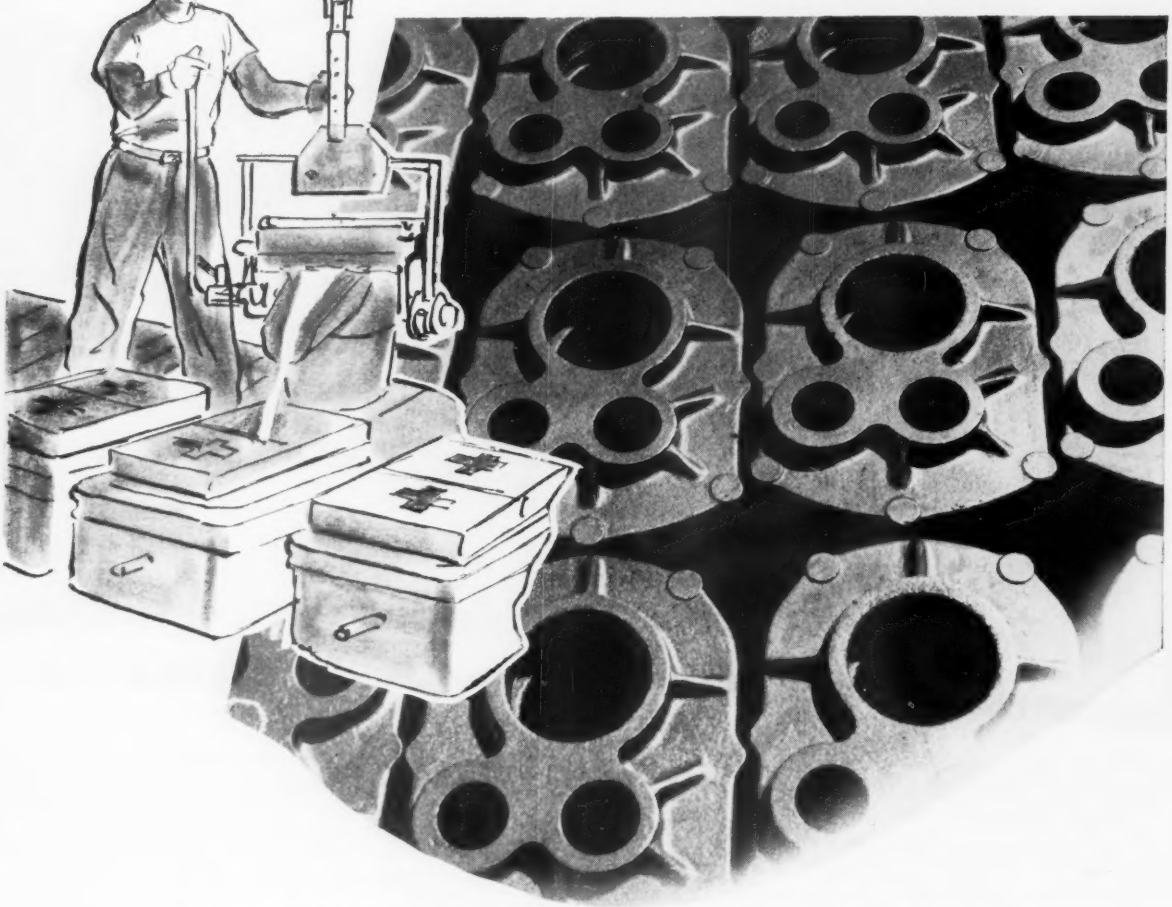
BABCOCK & WILCOX

THE BABCOCK & WILCOX CO.
REFRACTORIES DIVISION
GENERAL OFFICES: 161 EAST 42nd ST., NEW YORK 17, N.Y.
WORKS: AUGUSTA, GA.

Circle 607 on Inquiry Card—Page 225

R 838

CONSISTENT QUALITY . . .
Not Perfection



Pays Off for Both Foundryman and User

● Absolute *perfection* in castings is usually a pointless aim. It is also expensive and seldom necessary.

It is *consistent* quality that designers and engineers need, with the 10,000th casting as useful as the first. For any selected level of service requirements, you set the standard and hold to it. This is profitable and builds acceptance for castings.

Cooperation between the foundryman and user of castings can develop good design. Castings that are lighter, stronger and cheaper can usually be produced.

With Magnaflux' fast, low-cost non-destructive inspection methods, *all* cracks in any metal can be found and evaluated. Many cracks are unimportant, while some will call for corrective action. You thus can eliminate the needless scrapping of *good* castings for *seeming* defects that have no effect on service. Causes of any really serious defects can be corrected. Magnaflux, Magnaglo, Zyglo and Stresscoat are profitable tools in the foundry.

To insure consistent, reliable castings, once right procedures have been established, only a sampling "finger-on-the-pulse" inspection is normally required.

● *Ask to Have a Magnaflux Engineer Give You All the Facts—Soon*

MAGNAFLUX CORPORATION
7350 Lawrence Avenue — Chicago 31, Illinois
New York 36 • Pittsburgh 36 • Cleveland 15
Detroit 11 • Dallas 19 • Los Angeles 58

Circle 608 on Inquiry Card—Page 225

FLOWABILITY WITH DIXIE BOND

Pure
Southern Bentonite

SIX WAYS BETTER

1. Dixie Bond sand flows to give maximum mold hardness and improved casting finish.
2. Dixie Bond sand flows with reduced plugging of elevators and belts.
3. Dixie Bond sand flows with reduced hang-ups in the molders' hoppers.
4. Dixie Bond Sand flows at the shake-out with less lumping, easier knock-out, reduced flask maintenance and fewer broken castings.
5. Dixie Bond flows for accurate weighing and reduced hang-up in storage hoppers and feeders, together with improved pneumatic handling.
6. Dixie Bond slurries flow because of minimum viscosity with maximum solids content.

International Minerals & Chemicals

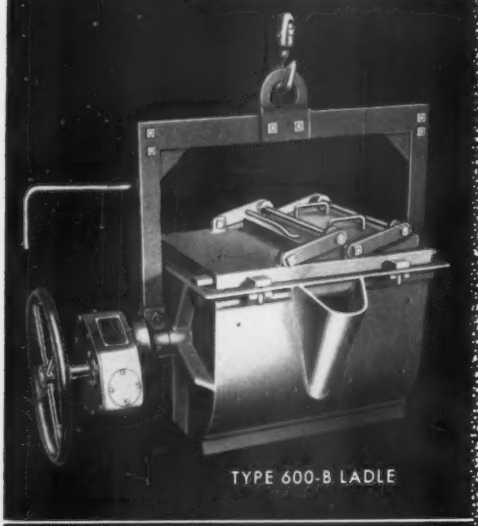
EASTERN CLAY PRODUCTS DEPT. • INTERNATIONAL MINERALS & CHEMICAL CORPORATION • 20 NORTH WACKER DRIVE • CHICAGO 6

Dixie Bond • Black Hills Bentonite • Revivo Bond • Plasti-Bond • Revivo Core Paste • Cupolinor • Cupoline • Taccone Molding Machines

Circle 609 on Inquiry Card—Page 225

Industrial Molten Metal Handling Equipment

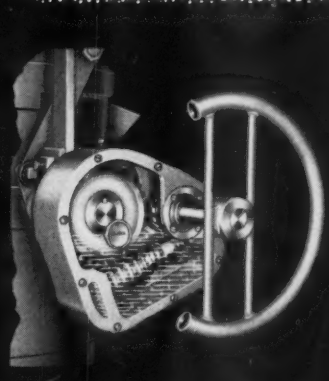
for exceptional efficiency and dependability under heaviest production schedules



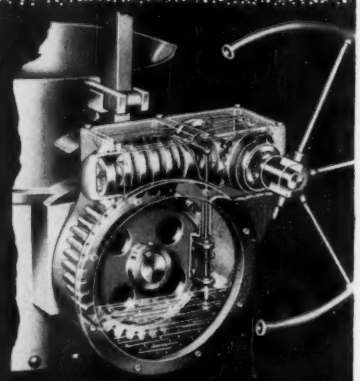
TYPE 600-B LADLE

Industrial Equipment Co. manufactures a wide range of geared ladles for every type of foundry service. For light duty pouring, specify Industrial ladles with Bantam worm gearing . . . for heavy duty pouring specify Industrial ladles with the exceptionally strong and dependable Timken worm gearing. The design and construction of both types of Industrial's gearing assemblies assure outstanding ease of operation, accurate pouring control and long trouble-free service. Binding as a result of heat distortion is eliminated—even if ladles are in constant use without a chance to cool. In addition to the many types of standard ladles, Industrial Equipment Co. also develops custom ladles for special applications.

TYPE 592-T LADLE



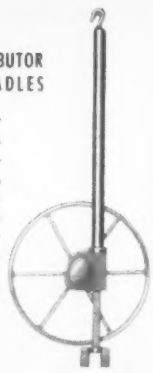
BANTAM WORM GEARING



TIMKEN WORM GEARING

INDUSTRIAL'S DISTRIBUTOR FOR POUR-OFF LADLES

Combines greater strength with less weight, one hand control, ease of pouring, trouble-free operation and greater safety to boost foundry production and lower costs.



TYPE U CRADLE CRUCIBLE TONGS

Design features . . . including self-adjusting contact pads . . . assure greater safety, ease of handling and efficiency. Seven types available for all makes and sizes of crucibles.

Industrial EQUIPMENT COMPANY
115 OHIO ST., MINSTER, OHIO

Write today for our complete catalog, with details of all our products—Ladles . . . Bowls . . . Shanks . . . Bails . . . Tongs

MANUFACTURERS OF CONSTANTLY IMPROVED FOUNDRY EQUIPMENT SINCE 1900

Announcing Schumann's
Research and Refining

TRIUMPH

THE REVOLUTIONARY **NEW** SCHUMANN

C.P.* BRASS AND BRONZE INGOT BAR

*KAUFMAN *C.P. (Controlled Process)*

Featuring a NEW HIGH IN QUALITY above and beyond the specifications

Now, I. Schumann & Co. answers the growing demand for a quality brass and bronze ingot with none of the disadvantages of either the old fashioned "rough-top" ingot or the newer charcoaled "smooth-top" ingot. Made by refining methods that continue where older methods stop, and poured under rigidly controlled conditions to give a new high in quality to a new and different shape known as the C. P. Brass and Bronze Ingot Bar.

Schumann Brass and Bronze Ingot Bars will save trouble, time, and money for you in all phases of foundry operations. Write wire, or call us today for our new booklet, "ABOVE AND BEYOND THE SPECIFICATIONS" describing the new C.P. Ingot Bar and illustrating how to recognize quality.

an exclusive process of

I. SCHUMANN & CO.

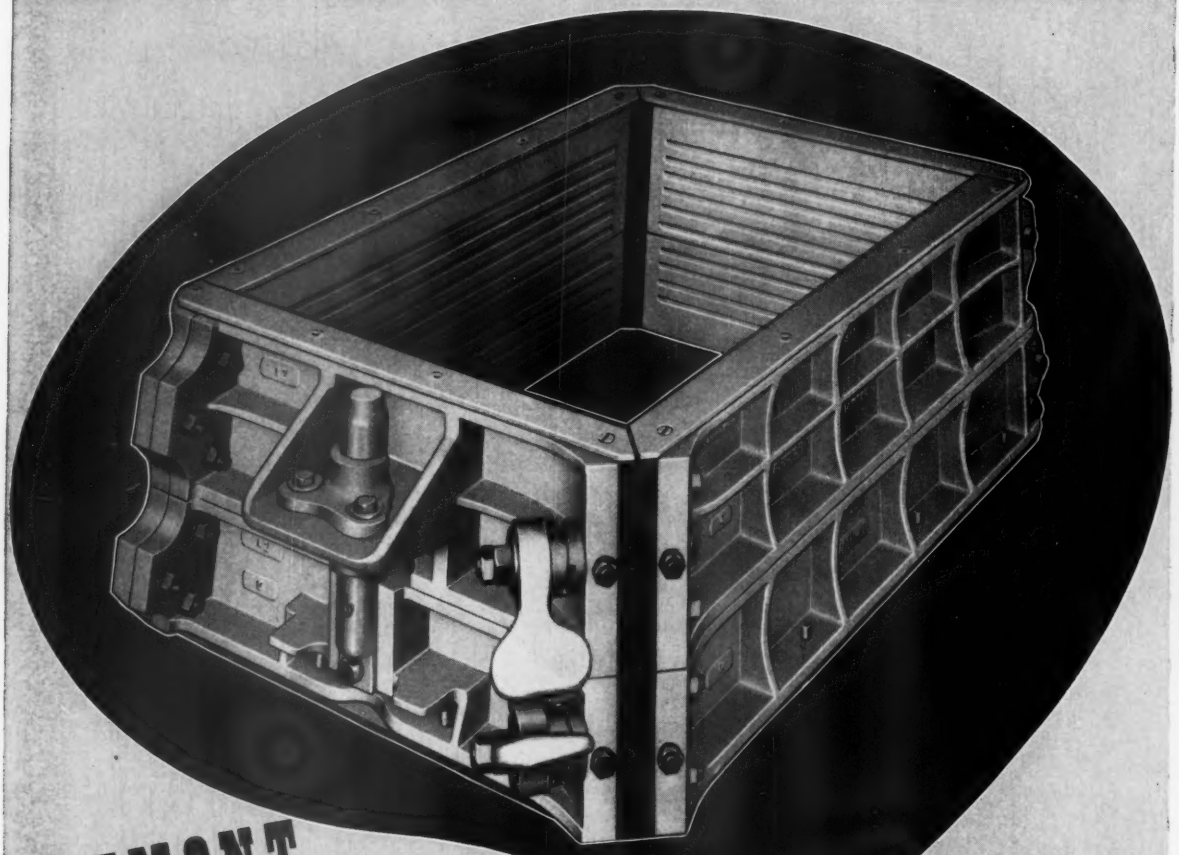
4391 Bradley Road • Cleveland 9, Ohio

*Pal. App. For

"PRODUCED WITH THE FOUNDRYMAN IN MIND"

Circle 611 on Inquiry Card—Page 225

There's a world of difference in flasks!



FREMONT MAGNESIUM SPREADLOCK FLASKS

SAND CANNOT LODGE IN CORNERS

Long-life, easily replaceable, live rubber corner inserts completely close the corner gaps.

LONGER SERVICE

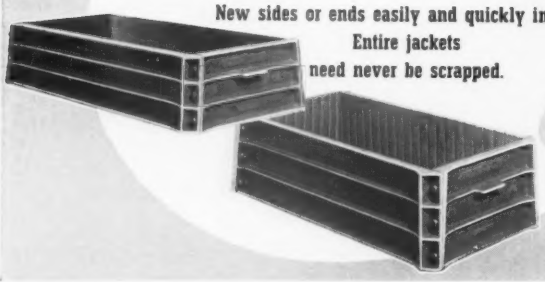
New two-piece male and female stop, inserted above and below the stud bolt, results in tremendous corner strength. Hardened forged steel cams.

LIGHTER, EASIER HANDLING

Write today for free literature and prices.

FREMONT CAST IRON OR CAST ALUMINUM JACKETS

New sides or ends easily and quickly inserted. Entire jackets need never be scrapped.



The Fremont FLASK Co.
FREMONT, OHIO

Circle 612 on Inquiry Card—Page 225

Circle 613 on Inquiry Card→

WANT TO MELT A MOUNTAIN OF METAL?

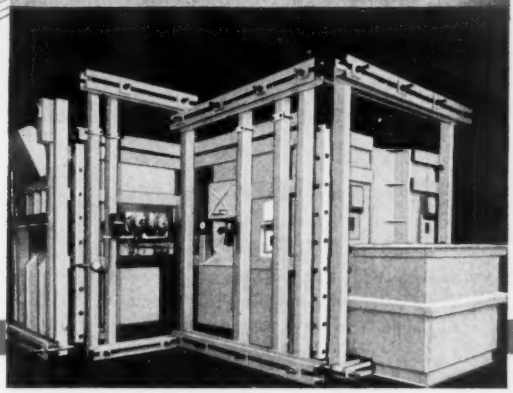
THESE BIG STROMANS WILL DO IT...BUT FAST!

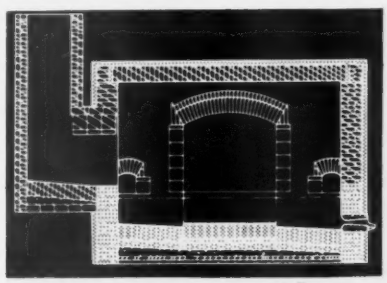
STROMAN LARGE SIZE REVERBERATORY FURNACES

For Melting Unlimited Capacities of Aluminum, Zinc or Brass

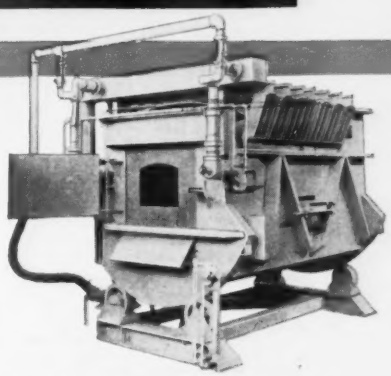
These reverbs are built to assure heavy duty production for Smelting, Extrusion work, Die Casting, Permanent Molding and Foundry melting. Now in operation in some of the most prominent plants in the country, they have proved their ability to deliver large tonnages of metal, are easy to work with and around . . . operate most economically and are easy to maintain. Their efficiency and economy will amaze you and convince you of their superiority.

Furnaces of this type are designed to meet customers' individual requirements . . . let our engineers show you how to achieve utmost efficiency and economy in your melting operations.

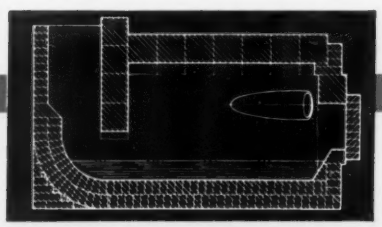




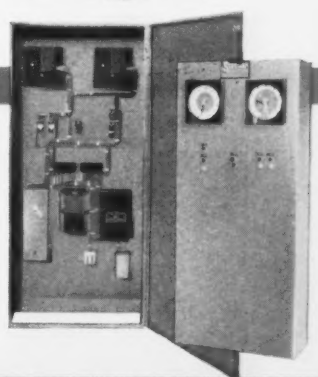
STROMAN TYPE "SW" CRADLE TILTING FURNACE FOR ALUMINUM MELTING SIZES FROM 1,000 TO 3,000 POUNDS



An ideal furnace for breakdown to supply hot metal to holding furnaces for die casting or permanent mold. Also for distribution to the molding floor in sand casting foundries. Tilted by means of an air or hydraulic ram. Furnished complete with gas or oil burners or combination burners, blower to furnish combustion air, and lining made of standard fire brick shapes.



Automatic temperature and safety controls available if desired.



STROMAN CUBICLE TYPE CONTROL PANEL

Stroman design monitor for furnace metal temperature, refractory temperature, high limit blower motor, circuit, electric ignition, and flame safety control, with completely automatic built-in warning system.

Don't forget STROMAN make furnaces for the melting of brass, bronze, aluminum, magnesium, grey iron and all other metals in sizes to meet your needs no matter how large or small.

Write for complete catalogue today!

STROMAN FURNACE & ENGINEERING CO.

DIVISION OF THE PETERSEN OVEN CO. • FRANKLIN PARK, ILL.

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Buenos Aires, Arg.
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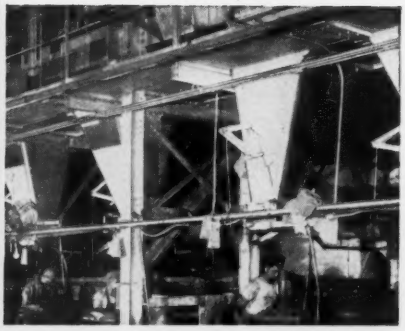
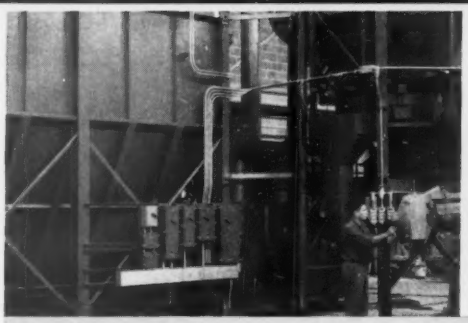
HUNDREDS OF FOUNDRIES CALL ON EXPERIENCED KNIGHT ENGINEERS FOR PRACTICAL, RELIABLE ASSISTANCE...





...ON VIRTUALLY ALL FOUNDRY PROBLEMS!

The key men in Lester B. Knight & Associates, Inc. have from 10 to 30 years successful experience in some phase of foundry management, production, engineering or equipment. The coordination of each man's specialized experience has enabled the Knight organization to complete hundreds of successful assignments in every type of foundry—grey iron, steel, malleable, brass and bronze, magnesium, and aluminum. These foundries are producing castings from a few ounces to 50 tons, and from 1 to more than 1,500 tons of castings per day. Green sand, dry sand, cement, plaster, "shell" molds, permanent mold, centrifugal, die casting and investment casting operations all have been served by Knight.

Working closely with clients' staffs, Knight Engineers have assisted its clients to audit operations, define management functions, establish organization, modernize methods and facilities, and design complete new plants. They have successfully applied automation in varying degrees to a number of different types of foundries, and have assisted management to establish more economical procedures for the control of operations and costs.

Your operation can benefit by this comprehensive experience. A letter will bring a call from a Knight representative at your convenience.

Write for Knight Bulletin No. 101, "Professional Foundry Engineering."

EVIDENCE OF EXPERIENCE

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Management, Industrial and Architectural Engineers

MEMBER OF THE ASSOCIATION OF CONSULTING MANAGEMENT ENGINEERS, INC.

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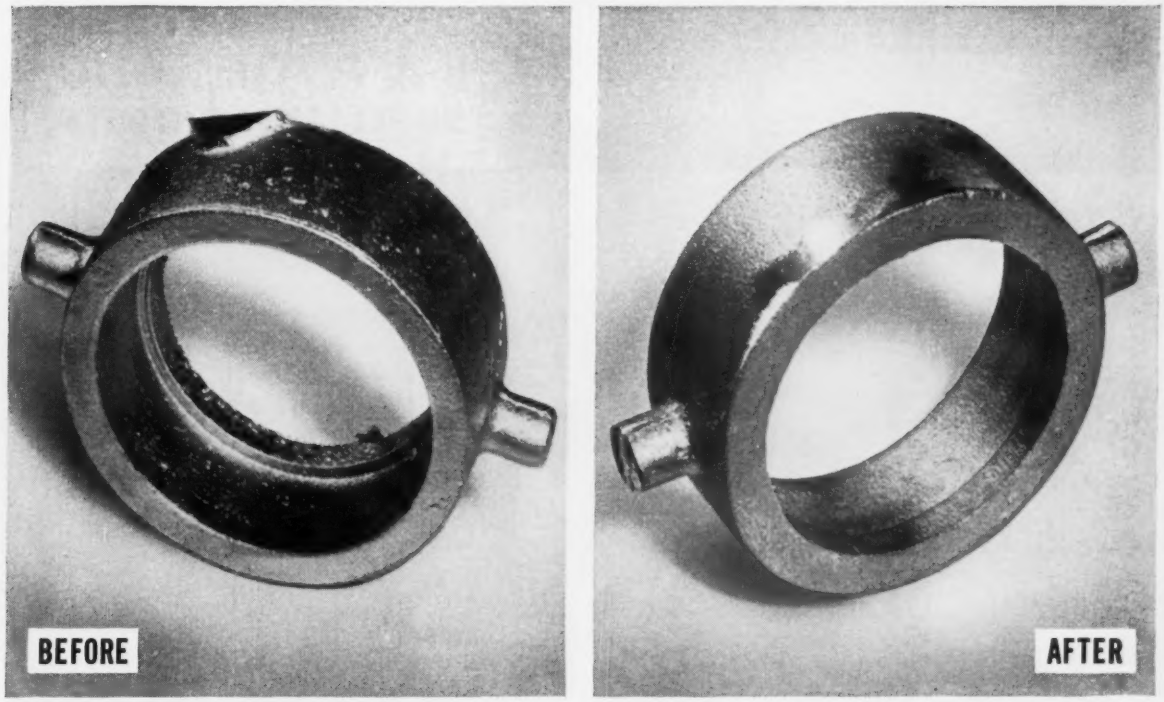
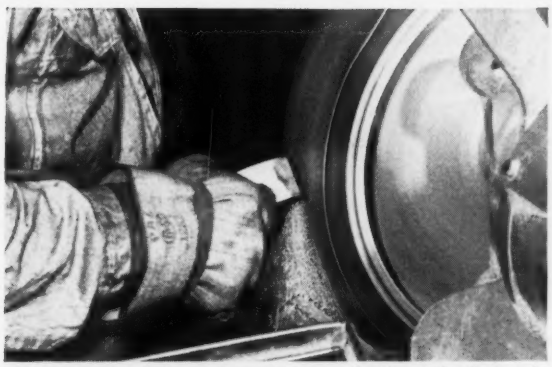
Circle 614 on Inquiry Card—Page 225

3M METHOD—better from start to finish



New Jersey foundry increases production 66% with 3M Abrasive Belts

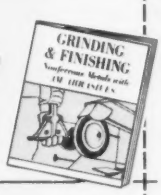


3M Abrasive Belts *are long-lasting production tools, designed to do the best grinding and finishing job at lowest cost to you.*

J. Rohm & Sons Co., Kenilworth, N.J., obtained this production increase when they switched to the 3M Abrasive Belt Method for removing excess gate and riser stock from this tough, bronze casting. This company formerly used hard wheels, grinding only 30 castings per hour. When the 3M Method was installed, using Three-M-ite Resin Bond Cloth Belts, production jumped to 50 units per hour with lower unit costs, less operator fatigue, and greater safety. 3M Abrasive Belts can help you increase production, too. Your 3M Representative is an abrasives expert who can show you how the 3M Abrasive Belt Method can work best in your foundry. Send coupon today for facts.

3M ABRASIVES

Write Today for FREE Booklet!



MINNESOTA MINING AND MFG. CO.
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☐ *Send me free booklet on grinding of non-ferrous metals.*
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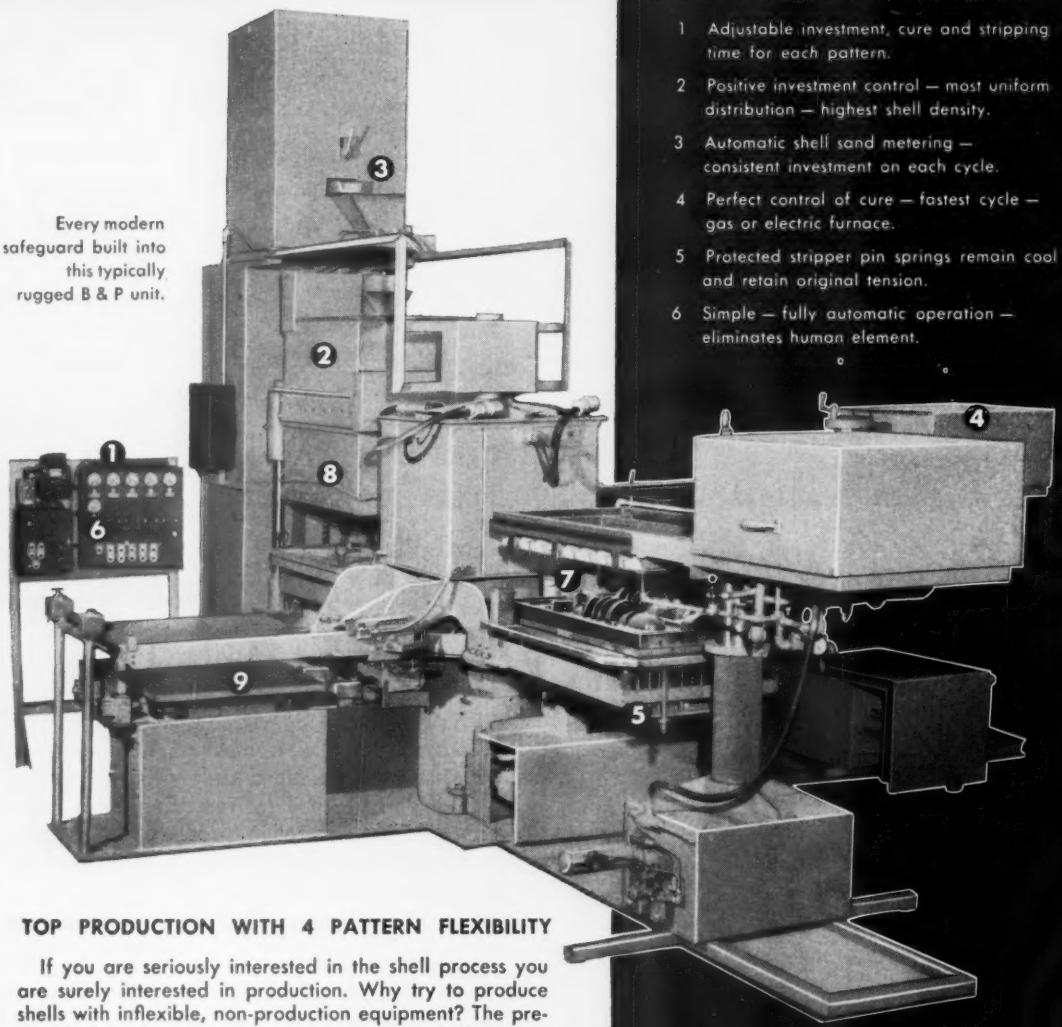
Made in U.S.A. by Minnesota Mining and Mfg. Co. General Offices: St. Paul 6, Minn. In Canada: P.O. Box 757, London, Ontario. Export Sales Office: 99 Park Avenue, New York City.

PRODUCT OF 3M COMPANY RESEARCH

A PRODUCTION PROCESS REQUIRES PRODUCTION MACHINERY

. . . that means B & P FORMATIC SHELL MOLD UNITS

Every modern safeguard built into this typically rugged B & P unit.



1 Adjustable investment, cure and stripping time for each pattern.

2 Positive investment control — most uniform distribution — highest shell density.

3 Automatic shell sand metering — consistent investment on each cycle.

4 Perfect control of cure — fastest cycle — gas or electric furnace.

5 Protected stripper pin springs remain cool and retain original tension.

6 Simple — fully automatic operation — eliminates human element.

7 Positive automatic thermostatic control for each pattern.

8 Water-cooled jacket — just one of the top-production features.

9 Fastest — smoothest automatic stripping cycle.

TOP PRODUCTION WITH 4 PATTERN FLEXIBILITY

If you are seriously interested in the shell process you are surely interested in production. Why try to produce shells with inflexible, non-production equipment? The precise shell production process requires precise shell production machinery and only the B & P Formatic can really meet that requirement . . . and provide quick-change, four-pattern flexibility with individual pattern control.

In these modern Formatic units, every operation is precise and automatic . . . every step in production is handled by production machinery. You can't afford not to investigate a one-pattern, two-pattern, three-pattern or four-pattern Formatic . . . part of the complete B & P line for shell molding, blowing and sand processing.

Beardsley & Piper, Div. Pettibone Mulliken Corporation, 2424 N. Cicero Avenue, Chicago 39, Illinois.

THE WORLD'S FOREMOST DEVELOPER OF FOUNDRY MACHINERY

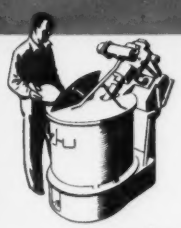
NOW for heavy duty grinding . . .

you can have the fast cutting action of a softer grade with long life of a hard wheel

SIMONDS New IL BOND

Available with Red Streak Flanges — for metal to metal fit on mounting equipment — another Simonds Abrasive exclusive.

Try SIMONDS ABRASIVE CO. SNAGGING WHEELS with New IL BOND



It's in the wheel mix! Special chemicals and compounds added to conventional resinoid bonds provide an internal lubricant which increases the abrasive cutting action—yet retains long wheel life.

IL bond gives a distinctly different grinding action on semi-automatic and regular swing frame grinders, on floor stands and portables. IL bond in harder grade will give longer life if your present cutting rate is satisfactory, and IL bond in the same grade will increase cutting action if your present wheel life is satisfactory. Write for descriptive bulletin.

SIMONDS ABRASIVE COMPANY

Tacony & Fraley Sts., Philadelphia 37, Pa.

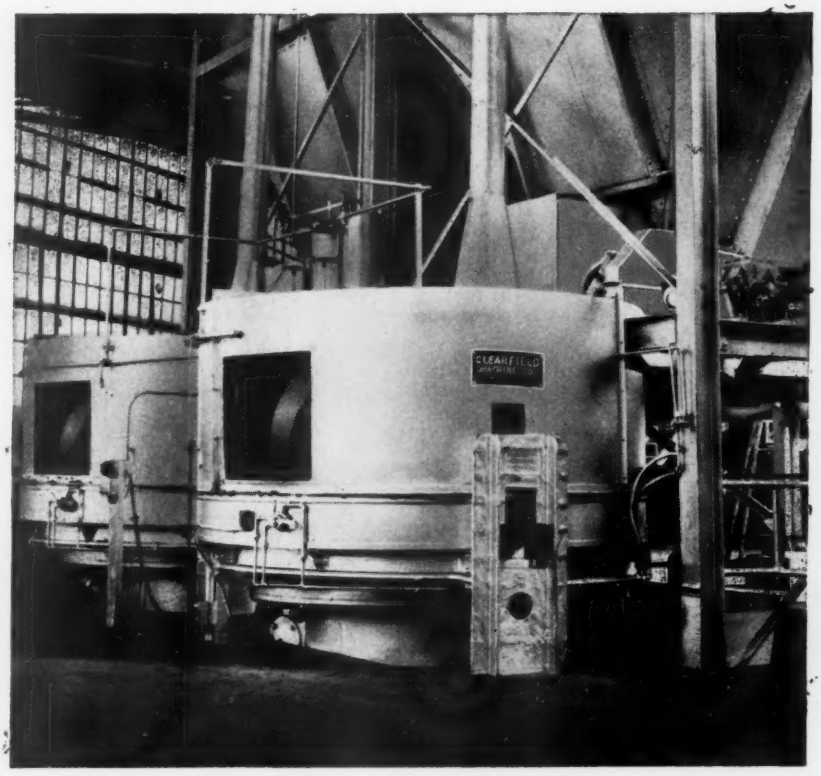
DIVISION OF SIMONDS SAW AND STEEL CO.

BRANCH WAREHOUSES: BOSTON, DETROIT, CHICAGO, LOS ANGELES, SAN FRANCISCO, PORTLAND

Circle 617 on Inquiry Card—Page 225

the

Clearfield Mixer



is engineered, designed and built to *prepare sand properly*

Write today for Catalog No. 83. Get complete details on the tested efficiency of Clearfield Mixers.

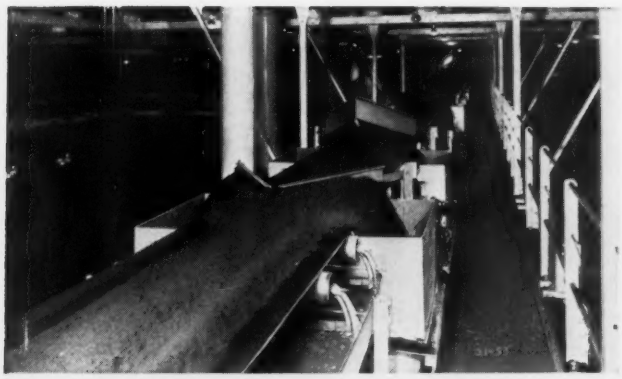
Properly prepared sand for best foundry results doesn't just happen. It's the natural result of using correct equipment and a matter of precision in controlling all factors involved. Clearfield Mixers always give you properly prepared sand, and there is a Clearfield for every requirement.

***CLEARFIELD MIXER** mixes, tempers, aerates*

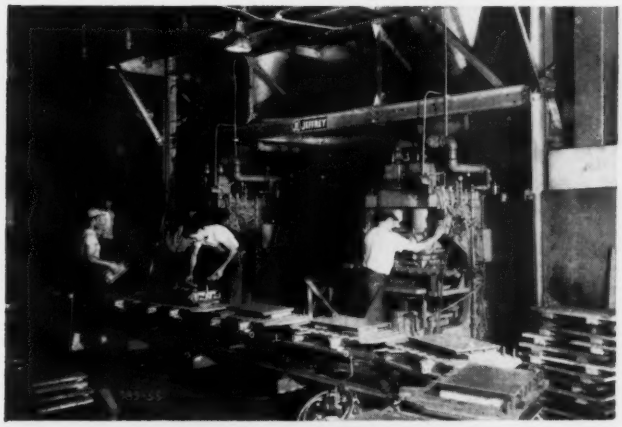
CLEARFIELD MACHINE COMPANY

Clearfield, Pennsylvania, U. S. A.

Circle 618 on Inquiry Card—Page 225



Jeffrey Sand Handling Belt Conveyor with Automatic Plows



Jeffrey Universal Mold Conveyor

Jeffrey Universal Mold Conveyor, Automatic Mold Dumper and Apron Conveyor

Jeffrey Apron Conveyor Handling Castings

you'll see the difference in foundries planned by JEFFREY

MECHANIZATION takes over many operations formerly requiring manpower—from sand preparation and distribution to the molders and core makers, to the pouring positions and shakeouts, then back to sand reclaiming and storage—moving raw materials and processing finished castings. Jeffrey services to the foundry industry are that complete.

We'll start with a survey, prepare layouts and recommend equipment, build and install a system to suit your exact requirements. We'll alter existing facilities or replace obsolete units with modern, efficient Jeffrey machinery.

Catalog 845 describes these services and equipment. For a copy, write to The Jeffrey Manufacturing Company, Columbus 16, Ohio.

JEFFREY

CONVEYING • PROCESSING • MINING EQUIPMENT
TRANSMISSION MACHINERY • CONTRACT MANUFACTURING

burg Times Herald

JANUARY 15, 1957

BETTER PRODUCTS SECTION

PHOTO COURTESY AMPCO METAL, INC., MILWAUKEE, WIS.

LITHIUM DE-OXIDIZES HUGE COPPER CASTING 99.8% Conductivity Obtained

MINNEAPOLIS—Special Ampco Metal, Inc., Milwaukee, Wis., obtained high structural soundness and electrical conductivity for the centrifugally cast copper ring (photo above) used in casting aluminum. As-cast weight of the ring was 1800 lbs. Approximate as-cast size is 50" O.D., 6" thick.

LESS THAN 1/5 of a pound of metallic lithium added to the melt resulted in a dense, oxygen-free casting minus only .2% of being 100% conductive.

AS LITTLE AS 0.005% (2¼ gram cartridge) refines high temperature copper, brass, bronze, and nickel-silver, producing a sounder, more uniform casting.

THE SALTS of Lithium, Carbonate and Chloride benefit the heat treater by lowering bath melting points.

Is your foundry using Lithium? Our banks of electrolytic cells can supply experimental grams or commercial tons. Send for details of actual foundry tests.

(ADVERTISEMENT)

Lithium Firm Doubles Sales for 9 Months

Lithium Corporation of America, Minneapolis, reported Thursday that in the first nine months of 1956 its net sales were more than double those in the same 1955 period.

Herbert W. Rogers, president, in a report to stockholders, said sales were $8,699,028 in the nine-month period, compared with $4,276,... the same period a ye...

1956 perio... ared wi...

Green Giant to Spend 2½ Millions on Can Plant and Warehouses

...t Co., Le Sueur, ed to a 47-per-cent increase ... Tuesday it net sales a... pared ... ss of ...

... trends ahead in industrial applications for lithium

LITHIUM CORPORATION OF AMERICA, INC.
2600 RAND TOWER, MINNEAPOLIS 2, MINN.

PROCESSORS OF LITHIUM METAL • METAL DISPERSIONS • METAL DERIVATIVES: Amide • Hydride • Nitride • SALTS: Bromide • Carbonate • Chloride • Hydroxide • SPECIAL COMPOUNDS: Aluminate • Borate • Borosilicate • Cobaltite • Manganite • Molybdate • Silicate • Titanate • Zirconate • Zirconium Silicate

BRANCH SALES OFFICES: New York • Pittsburgh • Chicago • MINES: Keystone, Custer, Hill City, South Dakota • Bessemer City, North Carolina • Cat Lake, Manitoba • Amos Area, Quebec • PLANTS: St. Louis Park, Minnesota • Bessemer City, North Carolina • RESEARCH LABORATORY: St. Louis Park, Minn.

Circle 620 on Inquiry Card—Page 225

Circle 621 on Inquiry Card→

FOR QUALITY THAT STANDS CLOSE INSPECTION

Pyle's mechanized foundry operation is devoted exclusively to pattern production. Capable of aluminum or magnesium castings, it assures uninterrupted flow of work to machines — keeps entire operation under one roof.

. . . we suggest you look to Pyle! Our business has been built serving customers who accept nothing less than perfection.

Here every wooden model is prepared in flawless detail by men averaging 19 years of patternmaking experience. Our integrated foundry is designed, equipped and operated exclusively for pattern production. We have the lathes, radial drills, milling machines, planers and hydraulic or automatic duplicators to meet your every need. Meticulous hand finishing and uncompromising inspection guarantee your complete satisfaction.

For fifty years we've made patterns for America's most quality-conscious firms. May we have the pleasure of making them for you?

PYLE

PATTERN AND MANUFACTURING COMPANY

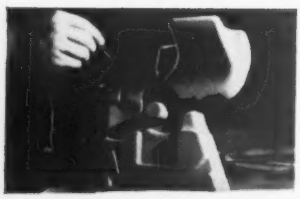
Muskegon Heights, Michigan

Coremaker cures larger core with portable CO_2 unit, using 50-lb. pressure. Cores are firm, easy to handle.

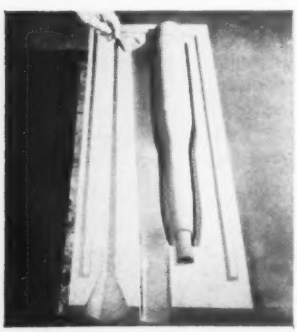
Cured cores ready to be taken to the metal pouring lines. Specially prepared core sand feeds through chute (left). Sand is hand-tamped into molds. Then CO_2 from jet (center) is shot into molds.

"New sodium silicate-CO_2 process cut our coremaking cost 21% and improved core quality"

—says HANS JACOB, Foundry Supt., Lehigh, Inc., Easton, Pa.



Intricate cores (above) and large cores and molds (below) are economically made and cured in only 2 to 3 minutes. Because no stockpiling of cores is necessary, core room runs as an integral part of the pouring line.



"Since we began using the sodium silicate-CO_2 process, coremaking has been much more efficient and economical," continues Mr. Jacob. "Pasting and mudding costs have been eliminated, and an over-all saving of 21% has been achieved. Hot tears and cracks, and 'lost' tolerances have been decreased, too. And the men in the shop like the new technique because it has no objectionable gases or fumes.

"Production is faster with the sodium silicate-CO_2 process. Most cores are used the same day they are cured," Mr. Jacob concludes.

High-quality Du Pont sodium silicate is available in formulated products for CO_2 systems from foundry supply houses throughout the country.

If you're thinking of adapting the new sodium silicate-CO_2 process to your operation, a Du Pont technical representative will be glad to discuss the process with you.

E. I. DU PONT DE NEMOURS & CO. (INC.)
Grasselli Chemicals Department, Wilmington 98, Delaware

DU PONT REG. U. S. PAT. OFF. **SODIUM SILICATE**

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

Circle 622 on Inquiry Card—Page 225

Circle 623 on Inquiry Card→

WE TAKE CARE OF ALL SIZES

Whether your ferro-alloy requirements be a barge load or drum, lump size or crushed, we are prepared to supply your needs.

Ohio Ferro-Alloys Corporation
Canton, Ohio

HOW DOES YOUR FOUNDRY GROW?

Through an increasing awareness of cast metals potential; through streamlined production methods; through continued research and new development.

Yes, these are the necessary growth factors. But they all stem from one source . . . sound, technical leaders and pre-indoctrinated customers.

The investment of the foundry industry in the student of today and tomorrow largely determines its potential. We cannot grow as an industry — or as an individual foundry — without soundly indoctrinated foundry technicians.

Through the efforts of the Foundry Educational Foundation, 31% of all engineering students at F.E.F. affiliated universities now participate in cast metals study. This means a large annual pool of capable producers for the foundry industry.

What are you contributing to that pool today, for your greater benefit tomorrow?

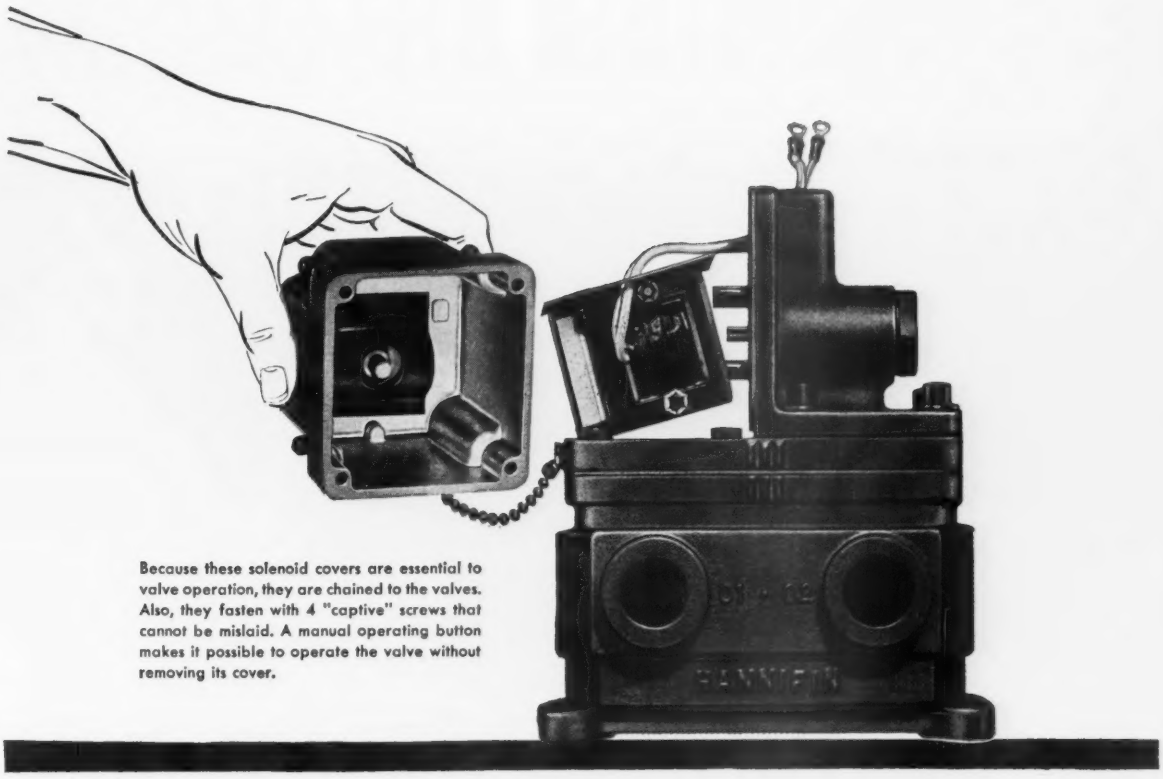
● *Write today for our detailed booklet, "Let's Look Ahead".*

Attend the Foundry Educational Foundation 10th Annual College-Industry Conference • March 13-14, 1957 • Hotel Cleveland, Cleveland, Ohio.

Foundry Educational Foundation

1138 TERMINAL TOWER BUILDING • CLEVELAND 13, OHIO

The Foundry Educational Foundation does not pay for this advertising. This space has been contributed by FOUNDRY magazine in support of FEF's constructive program for foundry industry progress through education.



Because these solenoid covers are essential to valve operation, they are chained to the valves. Also, they fasten with 4 "captive" screws that cannot be mislaid. A manual operating button makes it possible to operate the valve without removing its cover.

Now! solenoid-controlled air valves that defy improper maintenance ...they won't operate with their covers off!

When a solenoid valve operates without its cover, trouble is not far off. Dirt, oil, cutting fluid, chips are sure sooner or later to jam the solenoid, and the valve will fail to shift.

That can't happen with these new Hannifin valves!

The solenoids are held in place by their covers and won't operate the valves unless the dust-tight, splashproof covers are firmly tightened.

These new valves, which conform to the latest J.I.C. recommendations, are part of the complete "P-M" Pilot-Master line. New heads with these new solenoid covers are offered on 2-way, 3-way and 4-way Pilot-Master Valves (air-operated). The smaller, direct-operated 3-way and 4-way valves in the "P-M" line have been redesigned to use the same new covers. This added feature is just another reason why it pays to standardize on Hannifin air control valves.

AIR CONTROL

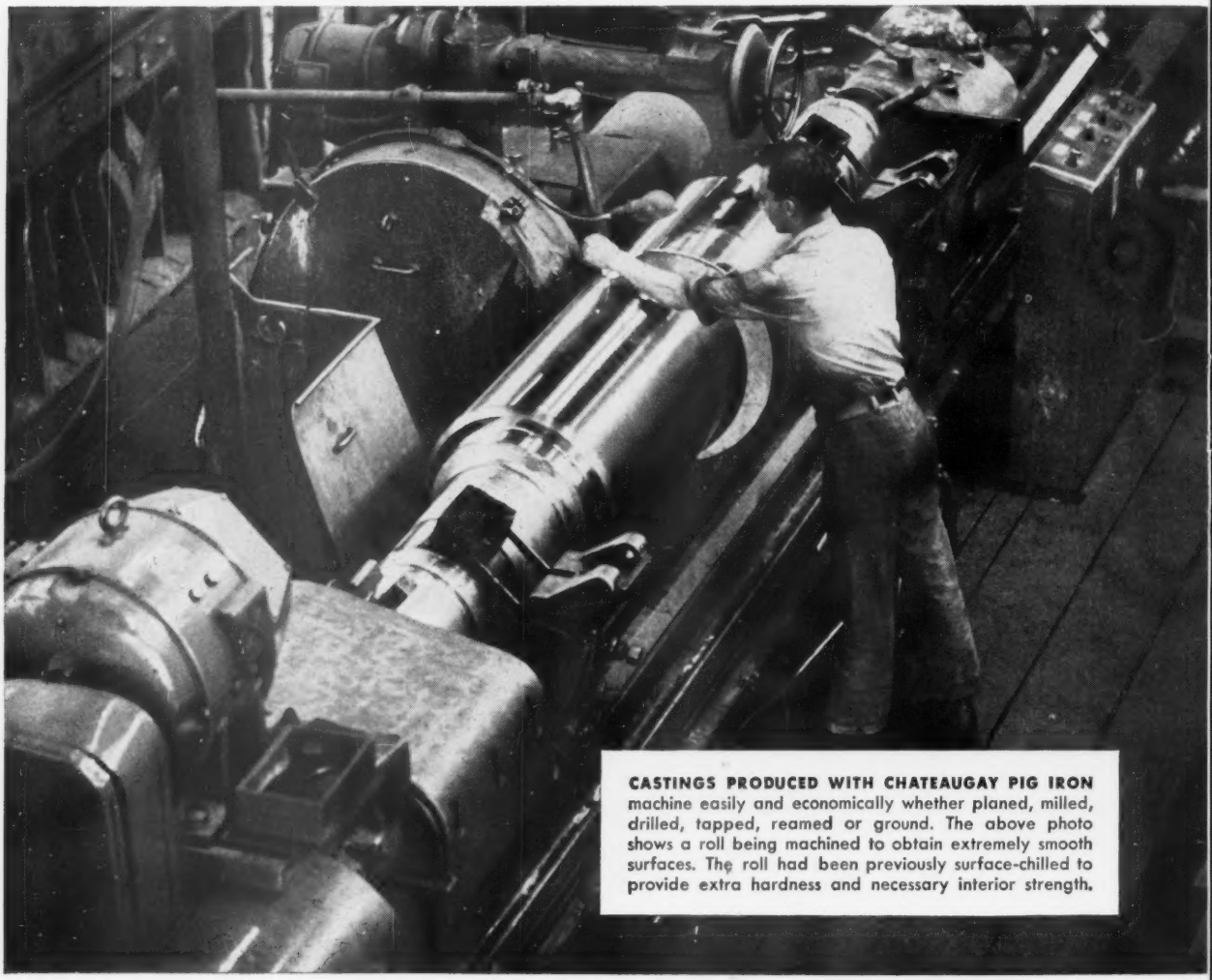
HANNIFIN

VALVES

Complete information on all Hannifin Air Control Valves is in this catalog. It belongs in your files. Write for your copy. Hannifin Corporation, 637 S. Wolf Road, Des Plaines, Illinois.

Exclusive Chemistry of Chateaugay Pig Iron

HELPS FOUNDRYMEN MEET EXACTING



CASTINGS PRODUCED WITH CHATEAUGAY PIG IRON machine easily and economically whether planed, milled, drilled, tapped, reamed or ground. The above photo shows a roll being machined to obtain extremely smooth surfaces. The roll had been previously surface-chilled to provide extra hardness and necessary interior strength.

REPUBLIC

REPUBLIC STEEL

World's Widest Range of Standard Steels

REQUIREMENTS

For more than 50 years, foundrymen have used Republic Chateaugay Pig Iron to help them lick the tough casting jobs. They know Chateaugay's properties and characteristics are unequalled by any domestic pig iron. They also know that Chateaugay can be depended upon to meet the most exacting casting requirements.

The rolls used in the manufacture of paper, plastics, rubber, metals of all kinds, steel, copper, brass, aluminum, even breakfast cereals, are a good example of how Chateaugay lives up to its reputation.

Foundries producing these rolls have found Chateaugay the ideal pig iron to use in meeting the demands for hard, wear-resisting surfaces; for strength; for heat-resistance; for machinability.

One foundryman put it this way: "Chateaugay is indispensable in this application because of its finer graphite structure and grain refinement. The exclusive inherent chemistry of Chateaugay tends to nucleate the fine graphite flakes, producing a finer, condensed grain structure that gives the rolls increased strength and wear-resistance."

This fine dense grain structure also provides excellent and economical machinability and reduces scrap loss to an absolute minimum.

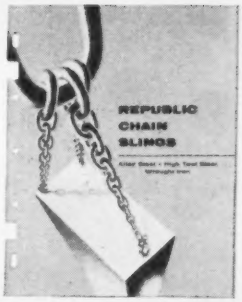
Chateaugay offers other superior characteristics which make it ideal for a wide variety of casting applications. It is an exceptionally fluid iron—cools evenly—fills adjoining light and heavy sections completely—produces tough, sound castings accurate to patterns and shapes.

A Republic Pig Iron Metallurgist will be glad to show you how the advantages of Chateaugay, the low-phosphorus, copper-free Pig Iron, can be applied to your production. How the year-in, year-out uniform chemistry of Chateaugay can help you produce consistently high quality castings. Mail the coupon today. There's no obligation.

STEEL

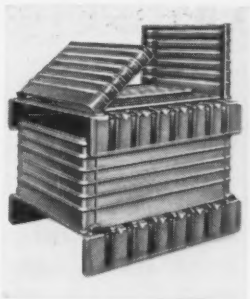
and Steel Products

MEETS LIFTING REQUIREMENTS—Republic Chain Slings provide a safe method of lifting heavy and hard-to-manage materials. This new catalog contains complete information and specifications on Republic Chain Slings, Attachments and Accessories. Tells you how to use slings properly to obtain maximum life...how to store...how to inspect...how to order. Send the coupon for your copy.



MEETS STRENGTH REQUIREMENTS TO WITHSTAND ENORMOUS WEIGHTS—Republic Wedge-Lock Steel Shelving is specifically designed for high stacking of such heavy items as castings, dies, tools, etc. Joints actually get tighter as weight increases. There's no distortion or instability. Wedge-Lock Steel Shelving also provides maximum loading in minimum floor space and assembles quickly and easily. Send coupon for more facts.

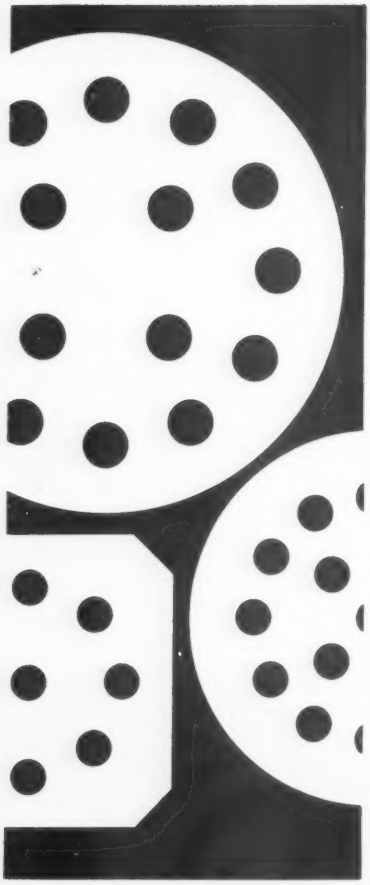
MEETS STRONG CONSTRUCTION REQUIREMENTS — Republic Materials Handling Equipment assures long, efficient service at lowest per-year cost. Illustrated is the PB-127 Collapsible Box, ideally suited to shipping castings and other heavy items. It is designed for heavy-duty service. It can be tiered when loaded or empty, collapsed or set up. All parts are permanently attached. Offers up to 66% saving in storage space. Write for facts.



REPUBLIC STEEL CORPORATION
Dept. C-2919
3132 East 45th Street, Cleveland 27, Ohio

☐ Please have a Pig Iron Metallurgist call.
Send more information on:
☐ Chain Sling Catalog ☐ Wedge-Lock Steel Shelving
☐ Collapsible Boxes

Name_____ Title_____
Company_____
Address_____
City_____ Zone____ State____



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The fusion point of this high temperature refractory material is 3056°, safely above the pouring temperature of metals. We have a wide variety on hand, or can make to order. Ask for samples and quotations.

DU-CO CERAMICS CO.
BUTLER 10, PA.

Circle 627 on Inquiry Card—Page 225

Readers' Comment

A Question of Safety

TO THE EDITORS:

The picture on your cover of the January, 1957, issue is good, and it looks like some safety measures are being used. The men are dressed satisfactorily and the floor is clean. The guard rails, the top of the drag and the bottom of the cope flask are painted yellow. But I am wondering about the hooks which are holding the cope by their points while the men are giving the last look and hoping that everything will be all right.

Here's hoping everything turned out all right.

TOM NOVAK

1801 *Michigan Ave.*
St. Louis 4

●

TO THE EDITORS:

My attention has been directed to the illustration on the cover page of the January issue of FOUNDRY. I am wondering whether special hooks are used on this lifting rigging, because from this illustration one is led to conclude that this cope is being lifted on the points of the hooks which is contrary to handling practices and recommendations by chain and sling manufacturers.

H. N. RAHN
Plant Safety Engineer

Ingersoll-Rand Co.
Phillipsburg, N. J.

●

TO THE EDITORS:

We have your letter of Jan. 15 referring to comments which you have received concerning the Kodachrome picture published on the cover of the January issue of FOUNDRY.

First of all, let me say that it is most gratifying to learn of the interest and concern shown by readers for the promotion of safety in our industry. We are aware of the fact that it is not considered good practice to use the points of hooks for lifting heavy copes. Generally, this rule is followed in our plant with certain exceptions, including the one shown in the illustration.

This particular item is produced in our large dry sand foundry. The hooks are of cast steel, alloy heat-treated composition and are designed to lift extremely heavy loads.

When lifting heavy loads we insist on placing the hooks through the looped handles shown adjacent to the hooks in the illustration. Because these copes are so much lighter than the average cope lifted in this foundry, we have permitted the practice shown in the picture for the last 25 years without breaking or damaging any of these hooks. Whether or not this departure is considered good practice and is justified in this case may be debatable. However, this is our explanation and to date we have suffered no ill consequences.

I might further state that under no conditions do we permit any employees to work under copes that are suspended from the cranes without ground support.

J. E. JOHNSON
Works Manager

Blaw-Knox Co.
Continental Foundry & Machine Div.
East Chicago, Ind.

* * *

Suggests Graphite Chills

TO THE EDITORS:

In the January issue of FOUNDRY on page 120 there is a reference to chills for wheel tread warp. We would suggest that you advise the gentleman making this inquiry that he might try using graphite chills manufactured from electric furnace graphite, not natural graphite. You may find chills made from manufactured graphite to be of help in disposing of many of the troubles that are now experienced with chills, such as warping, etc.

V. J. NOLAN

National Carbon Co.
Div. of Union Carbide & Carbon Co.
30 East 42nd Street
New York 17, N. Y.

* * *

Wants More Plain Talk

TO THE EDITORS:

I am beginning to get fed up on the language used in talks and articles discussing foundry practices. Authors apparently do not realize that it is more important to explain their subject to the men responsible for results in the shop than to the foundry's top brass, metallurgists and engineers.

Why send our foremen and supervisors to meetings and furnish them technical papers when we know they won't understand half of what they hear or read?

How many of our foremen and supervisors know the meaning of such things as hypoeutectic and hypereutectic irons, modulus of elasticity, or reduction of area?

The 1955 Penton Census shows that

MAKE CUPOLA ADDITIONS FAST...EASY...ACCURATE

with "EM" Ferro-Alloy Briquets

FOUR KINDS of "EM" briquets are available for cupola additions: Chromium, Ferromanganese, Silicomanganese, and Silicon.

Three types of shipment are offered to meet the varied needs of the foundry industry: packed on pallets, packed in 250-lb. bags, or bulk.

Pallets facilitate handling, storage, and inventory control, and can be moved either by lift truck or overhead crane.

To aid in control of composition, each "EM" briquet contains a definite weight of alloying metal and is designed to minimize oxidation loss.

For further information on how "EM" briquets can help you, contact the ELECTROMET office in your area. Ask for booklet "Briquetted Alloys for the Iron Foundry Industry."

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METALS DO MORE ALL THE TIME ... THANKS TO ALLOYS

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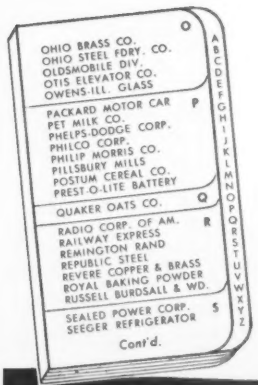
FERRO-ALLOYS AND METALS

The terms "Electromet" and "EM" are registered trade-marks of Union Carbide.

"EM" briquets contain exact weights of the alloying elements and thus make exact cupola additions easy.

The LEADERS use Logan

Handling costs are reduced to a minimum in this modern foundry. Logan Roller Conveyors serve each molding machine, handling molds through pouring and cooling to shake-out and returning empty flasks.



"If you can't lick 'em, jine 'em." Maybe that tough-to-beat competitor is using Logan material handling equipment! If you are not already a Logan Conveyor user, this is a cordial invitation to join the list of industrial leaders who employ this efficient aid to: Step up production tempo, increase capacity, speed deliveries, save manpower, decrease labor turnover. Write for further information or for nearest engineer to call.

LOGAN CO., 580 CABEL ST., LOUISVILLE 6, KY.

Logan Conveyors

2690 foundries in the United States and Canada employ fewer than 20 persons. Probably not more than 10 per cent of these foundries employ an engineer or metallurgist. This means that approximately 2400 plants are operated by practical foundrymen who lack any great degree of technical knowledge and the ability to understand most of the highly technical language used to describe their craft.

Recently while attending a technical session at a foundry convention I noticed a group of men who obviously did not fully understand what was being said. After the session was over they stayed on to discuss the subject.

Because I was interested in them I asked if I could be of help. They welcomed my offer and we sat down for a session lasting more than an hour. They were all fine young practical foundrymen in different types of supervisory positions, but they admitted that without our extra discussion session they would not have understood the subject the speaker had presented that day.

Because many small foundries cannot afford a full-time metallurgist or engineer, and because many foundries without modern facilities find it difficult to attract engineers, we should attempt to keep our thoughts and writings in terms that the average man can understand. Casting buyers also are not always familiar with our manufacturing processes, and they too should be considered when we attempt to explain the technicalities of our industry.

WILLIAM S. THOMAS
Vice President

Emmaus Foundry & Machine Co.
Emmaus, Pa.

• • •

Hungarian Seeks Position

TO THE EDITORS:

I recently left Hungary for Austria. Am a mechanical engineer and have worked chiefly in foundries, the most recent in the experimental department of the largest Hungarian iron and steel foundry. Have written a number of reports and articles published in magazines.

I am 31, and would like to bring my wife and three children to the United States, and would appreciate greatly any help in procuring a suitable position. Have a good command of German, speak Czech but cannot speak English although I read it readily.

NIKOLAUS V. CSEH

c/o Frau Manya Pangratz
Obere Kirchengasse 20
Langenzersdorf
Vienna, Austria

Why Grandmother!

Stories on cleaning room problems—just like the kind you tell the youngsters—can have a happy ending. And we're writing new ones day after day for foundries where high snagging costs and low production have been wolfing up profits.

If *you* are ready to "cry wolf," let us send CINCINNATI (PD)° SNAGGING WHEELS to the rescue. Customers report that the fast, easy cutting action of CINCINNATI (PD) SNAGGING WHEELS really cuts snagging time . . . and thus saves money.

Our customers report, too, that POSITIVE DUPLICATION (PD) means *another* savings. "On grade" with a CINCINNATI (PD) WHEEL means all future (PD) WHEELS will act and grind exactly alike.

CINCINNATI (PD) WHEELS are made in vitrified and resinoid bonds for both ferrous and non-ferrous foundries and are available in a complete variety of sizes and shapes. *And these better, cost-cutting* (PD) WHEELS *are priced no higher than ordinary wheels.*

So, if grinding problems have you ready to shout for help, contact your CINCINNATI Grinding Wheels distributor. Or, contact us direct. Write, wire, or telephone Sales Manager, Cincinnati Milling Products Division, Cincinnati 9, Ohio.

(PD) POSITIVE DUPLICATION

CINCINNATI° *Grinding Wheels*

A PRODUCTION-PROVED PRODUCT OF THE CINCINNATI MILLING MACHINE CO.

°Trade Mark Reg. U.S. Pat. Off.

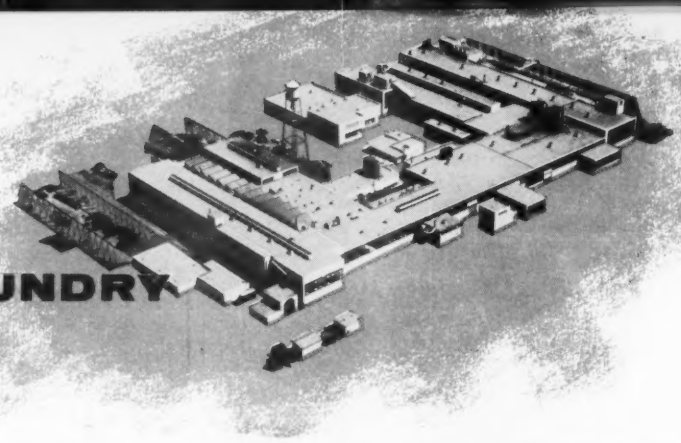
NEW

$5,000,000

WEST COAST

PRODUCTION FOUNDRY

PREFERS...



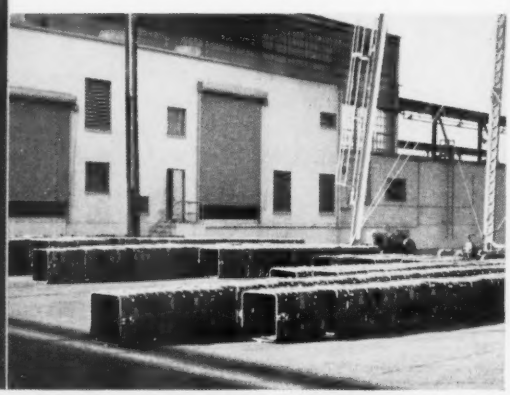
STERLING FLASKS

• Sterling Style ⅜ NDRTX Heavy Duty Flasks fabricated from special hot rolled channel steel. Illustration shows workman preparing molds for pouring.

General Metals Corporation, Oakland, California, has used Sterling Rolled Steel Channel Flasks successfully since 1933. So when this progressive firm erected their new $5,000,000 steel foundry, they naturally specified Sterling Flasks for producing castings. Today these rugged, all-steel flasks are used almost exclusively.

Sterlings are preferred because they are fabricated from special hot rolled channel steel — not merely pressed steel. This construction provides maximum strength with minimum weight, assuring accuracy and speed in molding. Sterlings last longer . . . produce better castings . . . cost less per year. The Sterling Catalog gives all the facts. Write for your copy.

STERLING WHEELBARROW CO.
Milwaukee 14, Wisconsin, U.S.A.



• Yard scene showing just a few of the thousands of Sterling Flasks purchased by General Metals Corp.

Circle 631 on Inquiry Card—Page 225

A 7-4507-1PC

Time for Action!

Users of iron and steel scrap, including foundries, have been greatly concerned over the rapid increase in exports of ferrous scrap. Protests have been presented to the Department of Commerce and the Congress by individual foundrymen and trade associations. Much effective work has been carried on by the Gray Iron Founders' Society, the Malleable Founders' Society and the Steel Founders' Society of America.

As a result of excellent statistics and convincing arguments presented by those organizations, Congress last June directed the Secretary of Commerce to make a complete survey of current and potential supplies of iron and steel scrap. The report on scrap resources, prepared by the Department of Commerce and Battelle Memorial Institute, has been completed and sent to the Congress.

Some of the conclusions of the Department of Commerce are as follows:

Domestic consumption and exports during the past two years represent all-time high levels of withdrawals of scrap from national resources.

Total net exports during 1955-56 were approximately 40 per cent of total net exports during the previous half century.

Based in part on recent domestic consumption practices and a level of exports projected at a rate of an annual increase of 5 per cent, the supply-demand situation indicates requirements for obsolete heavy melting grades in the future will be in excess of the rate of additions to the heavy melting scrap reservoir.

With a projected surplus of bundle scrap, full utilization of scrap resources can only be accomplished by a shift in the pattern of domestic and foreign scrap consumption. (Foundries cannot use this scrap.)

Continuous reduction in the reservoir of heavy melting quality scrap would have important implications for the steel industry, particularly the nonintegrated producers of steel products. (These include iron and steel foundries.)

In event of a sustained national emergency, when there would be a dislocation of prompt industrial scrap production, when the flow of obsolete scrap would be retarded by extended usage of old equipment, and when the use of more scrap would be required for maximum steel production, a serious shortage of iron and steel scrap would result.

This report surely emphasizes the validity of the contention, advanced by scrap users, that continued heavy exports of our best ferrous scrap are not in the national interest. It points to the need of curtailing exportation of scrap on a qualitative basis and education of foreign melters to the use of bundled scrap which is in plentiful supply.

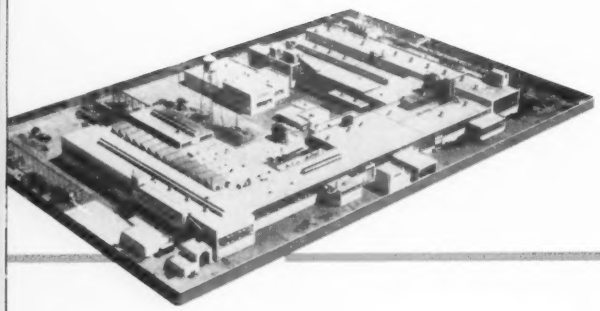
On the basis of its own report, the Department of Commerce should take immediate action. If this is not done, the Congress should force the department to apply restrictions.

Frank G. Steinebach

Editor

How a Jobbing Foundry Can Be Mechanized

Flexibility of Operation Is Keynote of General Metals Corp. Foundry



HOW BEST can we achieve the degree of mechanization and automation of high-production specialty foundries, and yet retain job foundry flexibility?" That was the question which the management at General Metals Corp., Oakland, Calif., posed for itself when it set out to design, build, and equip its new jobbing foundry. The plant was completed in April, 1955.

"The keynote to all our planning," says William E. Butts, president of General Metals, "was simply this—to adopt the techniques and equipment of production line foundries, yet retain the flexibility of the versatile job shop."

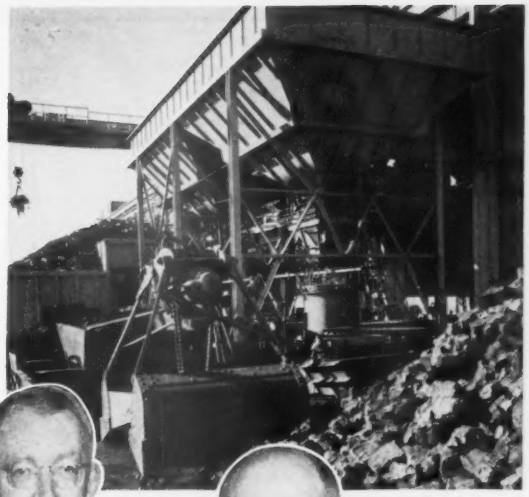
As a result, the new $5-million Oakland foundry, now in its second year of operation, is one of the show places of modern foundry mechanization. It is working at near capacity producing gray iron castings ranging in weight from a few ounces to 20 tons, representing a wide variety of miscellaneous work for approximately 250 customers. This in itself demonstrates a high degree of versatility.

The new foundry is attached to, and becomes the East L of the big steel foundry which was built by General Metals Corp. during World War II. In the new foundry, mechanization extends through practically every operation, combining the best in accepted foundry practice with a number of new ideas which have been introduced to accommodate jobbing conditions. It has a monthly capacity of 2500 tons.

A foundry in the West must anticipate expanding sales, so it must of necessity diversify its operation and be willing and able to take on a wide variety of work. In spite of the rapid growth of manufacturing in the West, there is still a limited amount of the high-production, high-volume commercial casting business on the scale known to eastern or captive foundries. This western situation dictates the necessity for job shop flexibility. Consequently, any successful large foundry operation in the West is a compromise between high mechanization and automation on the one hand for optimum economy in the production of large-volume work, and on the other hand, foundry operations geared to fill small orders. Applying mechanization to job work is the trick.

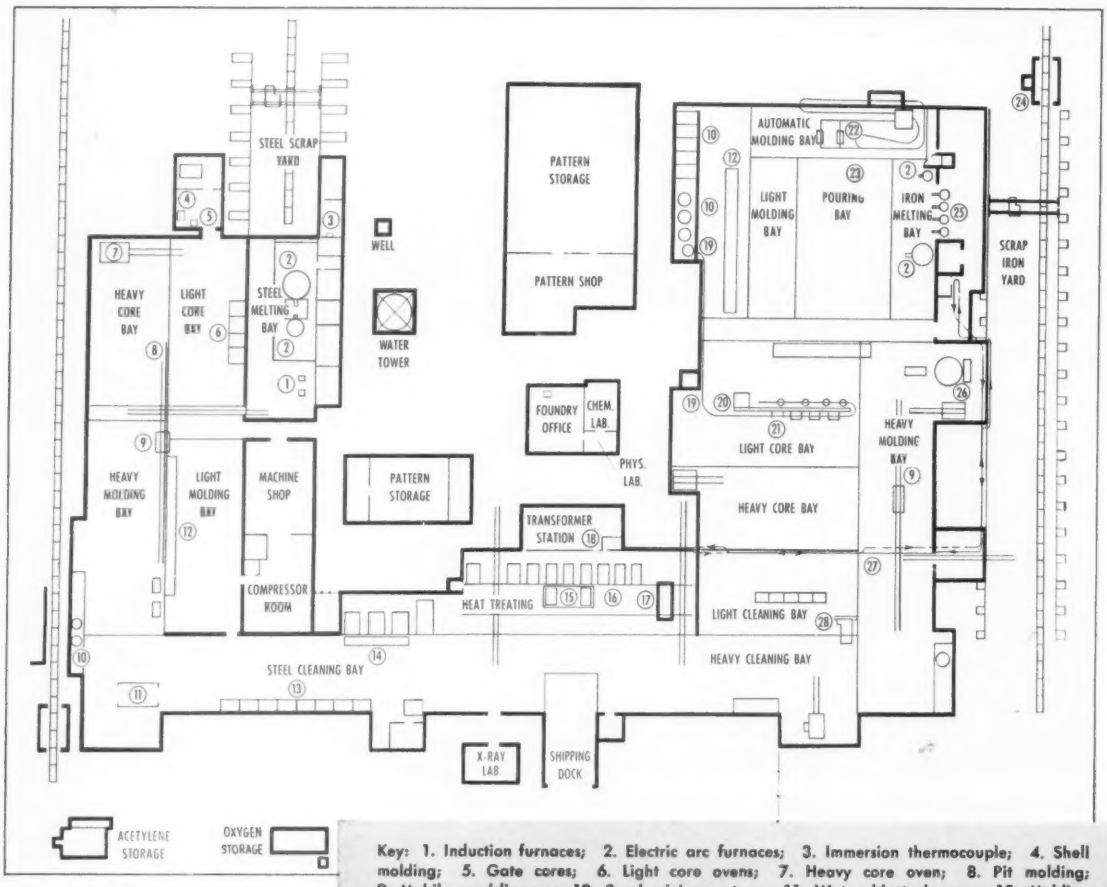
What Can Be Done—General Metals Corp. offers a startling example of what can be done in achieving a working balance. At one end of the new plant, the very latest automatic type molding machine delivers completed molds for automobile brake drum and hub castings at the rate of 220 an hour. This line produces 440 drums an hour for shipment to a California parts supplier who serves one of the major auto builders. The whole brake drum and hub casting process, from mold-

Hoppers with built-in scales weigh out limestone and coke for cupola charging



General Metals officials, left to right, are: William E. Butts, president; Philip Thayer, vice president-general manager; Philip McCaffery, plant manager; John Schaeffer, manufacturing manager. This photo was taken during a plant tour by Northern California Chapter of the AFS

Iron melting bay includes four cupolas and two electric furnaces



Plant layout showing the steel foundry at the left and iron foundry at right

Key: 1. Induction furnaces; 2. Electric arc furnaces; 3. Immersion thermocouple; 4. Shell molding; 5. Gate cores; 6. Light core ovens; 7. Heavy core oven; 8. Pit molding; 9. Mobile sandslingers; 10. Sand mixing system; 11. Water blast cleaner; 12. Molding machine line; 13. Swing frame grinders; 14. Normalizing furnaces; 15. Deep quench tanks; 16. Electric annealing ovens; 17. Giant manipulator; 18. Inert gas producer; 19. Core sand system; 20. Vertical core oven; 21. Stationary core-sand slinger; 22. Automatic molding machine; 23. Traveling mold cars; 24. Pneumatic sand conveyor; 25. Cupola furnaces; 26. Turntable slinger; 27. Trolley casting conveyor; 28. Airless blast cleaner. Right wing is the new iron foundry addition.

ing to cleaning, is carried out with a high degree of mechanization and automation. By contrast, in the center of the same bay, molds for 10-ton diesel engine blocks are made one at a time in a 16 x 16 x 10-ft-deep molding pit. Between these two extremes are varying degrees of mechanization and production volume.

A continuous type cleaning room receives an endless chain of brake drums and motor car hubs on the night run. During the day, you'll find hanging from the moving conveyor hooks anything from pronged, lawn spikers to intricate diesel engine fuel pump housings.

Coreroom work varies from hand operations to blowers and shell core machines. The variety of sizes, weights, and shapes of cores riding the conveyor belts to the vertical core ovens is an excellent example of the versatility of the plant's operations—cores for job work made on a production-line basis.

The following list gives a few examples of the variety of castings turned out in the iron foundry as to size and end use. This is a real "Duke's" mixture and represents a daily challenge to the ingenuity of the foundry's operators as they seek to make maximum use of their mechanized plant and automatic devices.

Description	Dimensions	Weight in Pounds
Diesel engine base	216 x 96 x 35 in.	39,400
Diesel engine block	165 x 73 x 52 in.	21,200
Fuel pump housing for tractor diesel engine	13¼ x 9 x 3 in.	49
Diesel engine tappet	2-in. diam x 4¾ in.	3.5
Typical glass mold	14 x 8 x 4 in.	65
Automobile brake drum	13-in. diam x 3¼ in.	19.6
Lawn spiker	7 x 6 x 2 in.	4
Cover, petroleum meter	5-in. diam x ¾ in.	2.5
Gland, petroleum meter	4¼ x 2 x 1½ in.	1.4
Die set for metal press	15 x 13 x 3 in.	50
Valve plug	20-in. diam x 29 in.	922

The accompanying photographs show some of

the equipment and illustrate the utilization of mechanization and automation in the new plant. Adoption of fully-automatic molding machines, sandslingers, turntables, automatic shakeouts, belt return of sand to storage, transportation of castings by trolley conveyor, latest abrasive cleaning equipment, all-electric annealing and heat treating, and the use of inert atmosphere in the annealing furnaces are some of the significant features in this plant.

Pattern Shop—The pattern shop is big, roomy, light, and clean. It's so clean, in fact, that draftsmen work right beside the patternmaking area with no partition between. A complete exhaust system carries off all sawdust directly from the machines. Clean air is provided by forced ventilation.

Here, too, we see a mechanized modern setup. Most of the machines are the latest models. A solid oak floor is built on concrete which provides space for all wires and utilities in the area between the joists. Lighting is from huge windows and fluorescent units. A 3-ton bridge crane is provided, and large doors open to the outside so that a truck can back right into the pattern shop. A pattern storage room is adjacent to the pattern shop.

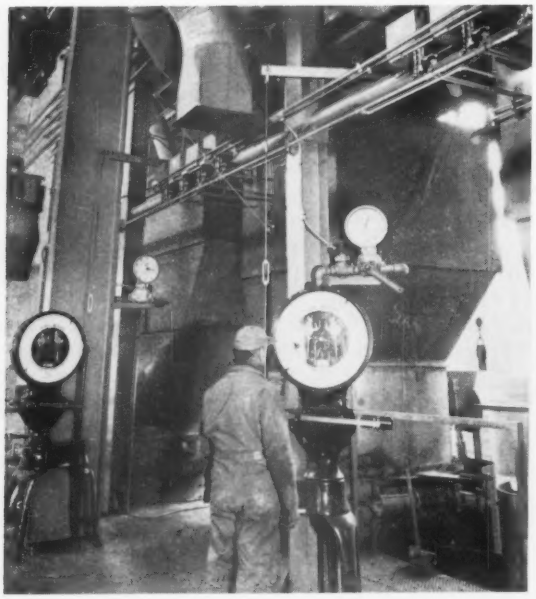
Some idea of the degree of automation and the compactness of layout of the foundry may be gained by a verbal flow-chart description. The progress of materials through the plant takes the following form:

Starting with Sand—In the plant lot, a track hopper receives sand from dump-bottom cars. Under the hopper is a drag belt which feeds automatically into a pneumatic conveyor system. When the hopper is filled, the gate drops sand into the blow chamber; from here it is blown through a pipe to the five-compartment storage bin 400 feet across the plant. Sand is drawn from the bottom of the bin from any compartment as needed, and the elevator can handle 120 tons per hour. From the bins, sand is drawn down to the muller in weighed charges of 1500 pounds each. The amount of mulling time varies with the type of sand. Binders are added at this point. Then the mulled sand is discharged onto the belt conveyors which distribute it to the molder hoppers.

The sand system for heavy castings has its storage bins in a corner of the main floor. The storage bins hold 225 tons. Sand is dumped through the floor grid and elevated for distribution to any of the bins. Sand is drawn off from any compartment and transported to the muller. After mulling, it is discharged onto the belt conveyor, which distributes sand to sandslingers in the heavy molding bay.

On to Molding—Molding space of the new iron foundry can be divided roughly into three areas for convenience of description: The heavy floor

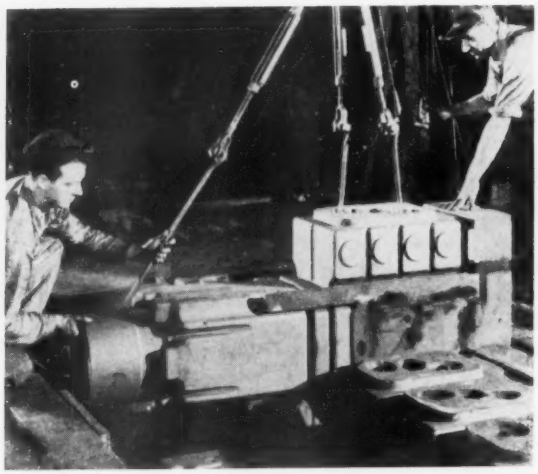
Cleanliness is the keynote of the pattern shop. All the utility lines and sawdust exhaust pipes are located under the oak floor



Weighing instruments and gages promote accuracy in the preparation of sand mixtures for molding

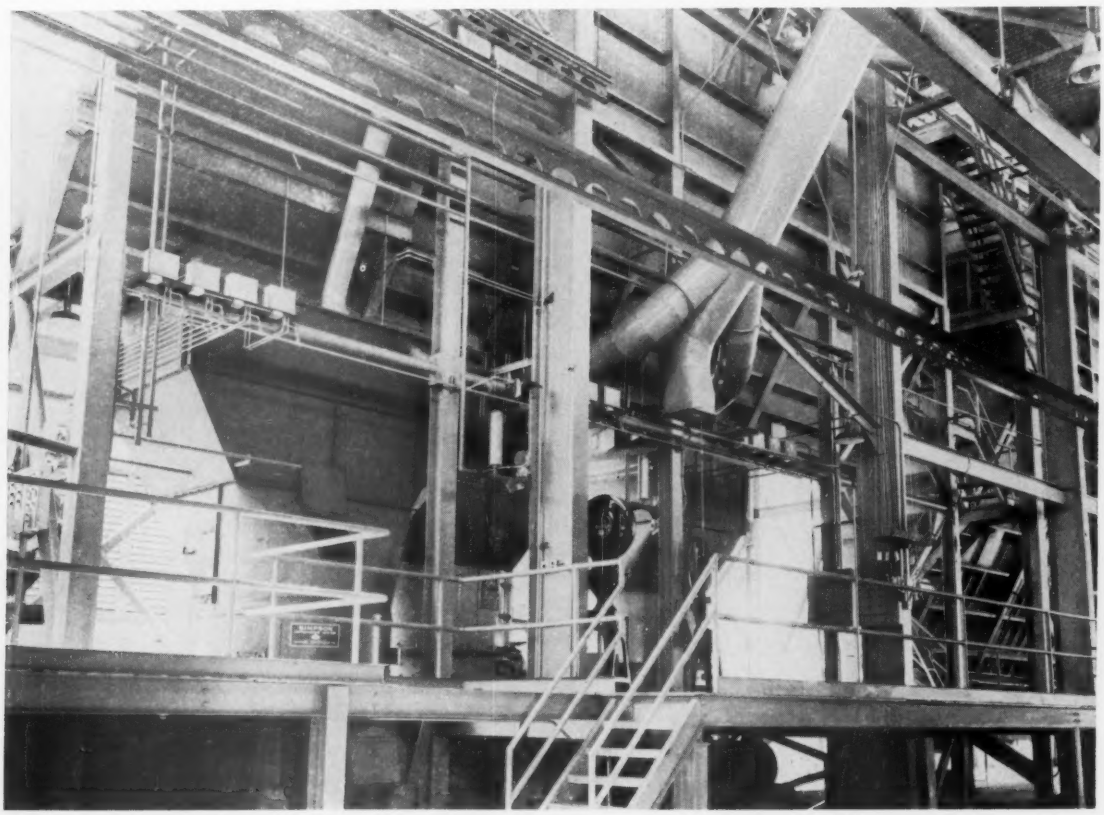
and pit molding area; the light molding area, and the automatic molding area.

Heavy Floor and Pit Molding—This area is split down the middle by 120 ft of track on which travels a motive type sandslinger with a capacity of 1 ton of sand per minute. On one side of the track are three molding pits—one 16 x 16 ft with a 10-ft depth, and two 10 x 22-ft pits with 5-ft



Placing large cores in a mold for a diesel engine block. Some engine castings weigh 20 tons

Muller floor for preparation of sand. The mixed sand is distributed to molders by belt conveyors



depths. On the other side of the track is an area for heavy floor molding. The slinger serves both sides. Overhead belts bring sand from the mullers to hoppers, which are picked up by overhead cranes to load the slinger anywhere along the track. There are two complete sand systems.

The variety of work done in the heavy molding area again typifies the whole General Metals operation. Here are big pit molds for outsize, heavy-duty diesel engine blocks, bases, and crankcases. There is heavy floor molding for small engine basic parts, frames and flywheels for big industrial presses, while big valve bodies and plugs add to the variety. Net weight of iron castings made from molds rammed in this bay range from about 1000 lb to 40,000 lb. Some molds for the steel foundry also are made in the heavy molding area of the iron foundry.

Pit molds and big floor molds too heavy to be moved are dried by portable hot air heaters. Moveable molds are transported by crane to a gas-fired, circulating, car-type drying oven measuring 20 x 12 x 10 ft. There is also a large, continuous mold drying oven.

Bridge cranes consist of one 10-ton and one 30-ton unit with a 10-ton auxiliary. The span is 60 ft. Gantry cranes with electric hoists are used for setting cores.

General Metals casts some of its own big steel flasks.

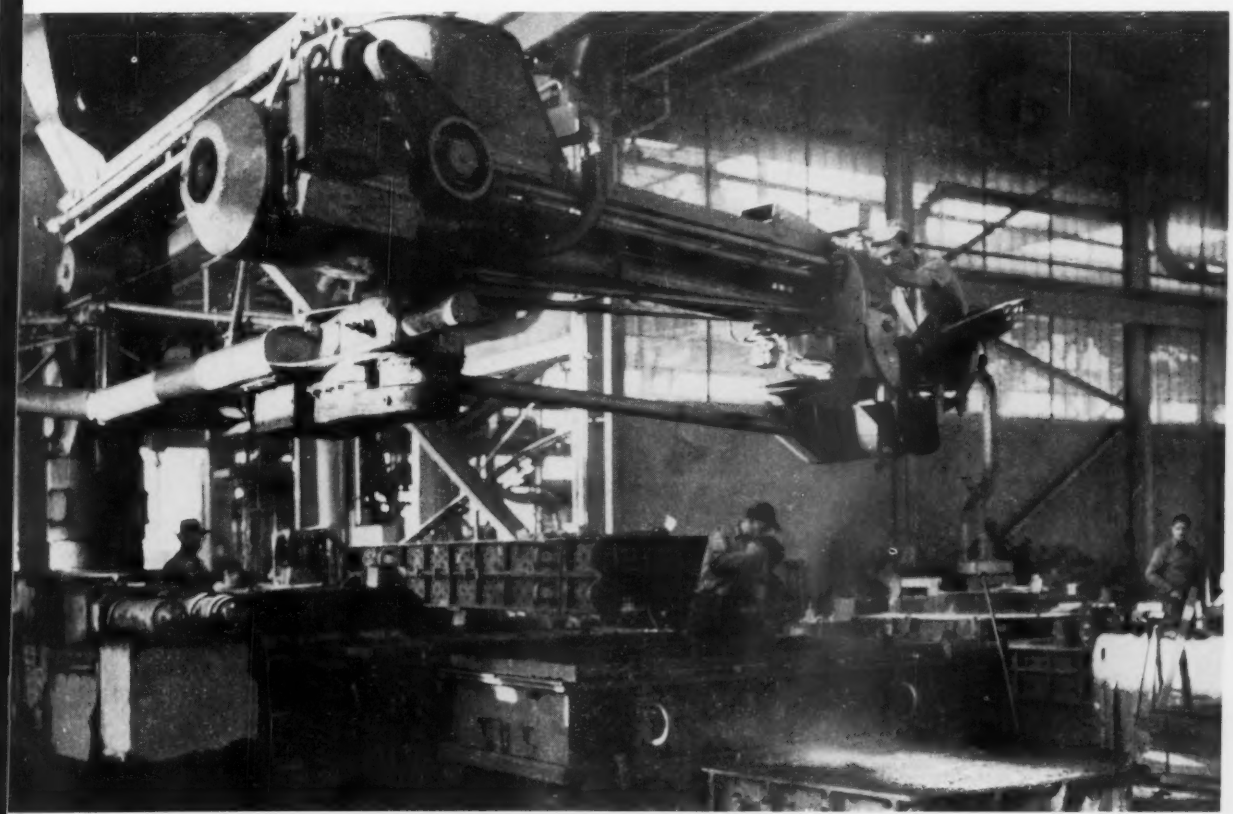
In an L off the heavy molding area is located a 20-ft-diam turntable for repetitious production molding and miscellaneous medium heavy floor molds. It speeds up production molding by the elimination of crane handling of molds; it frees the big bridge cranes for heavier work and cuts down the number of cranes needed. Boom-hung electric hoists handle flasks and patterns. Roller conveyors support molds while they are being finished and coated with mold wash, and cranes carry molds to the driers.

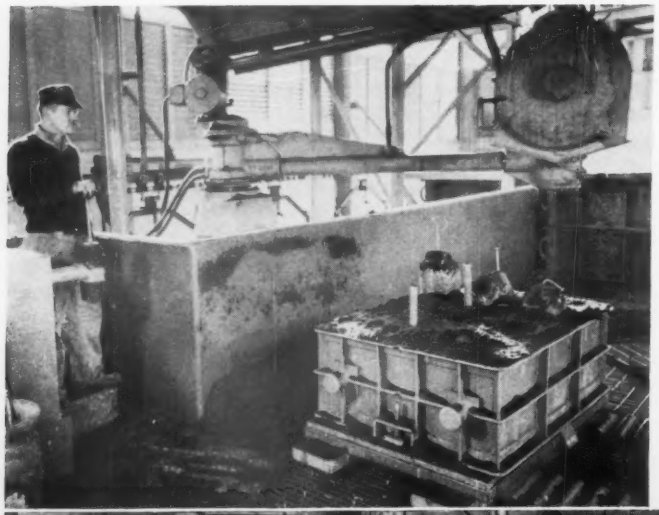
The turntable is served by a stationary slinger with 6-ft-diam plate feeders. Spilled sand falls through the grilled platform of the table and a pneumatic system returns it to storage tanks.

A rollover removes the mold from the turntable, draws the pattern, and places it back on the turntable.

Light Molding Area—The molding line has six jolt-squeeze machines and six pin push-off machines, of which two are combined with rollover draws. Molds made on the rollover draw machines and pin push-offs are transported on roller con-

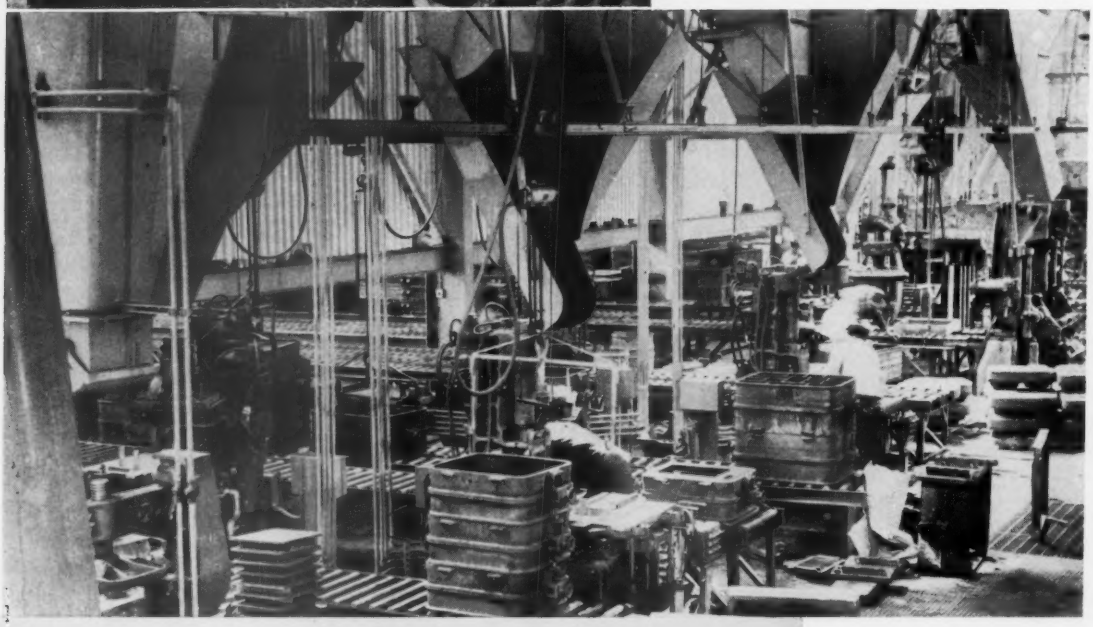
Motive type sandslinger moves over 120 ft of track in ramming large molds. Three molding pits are located along one side of the track

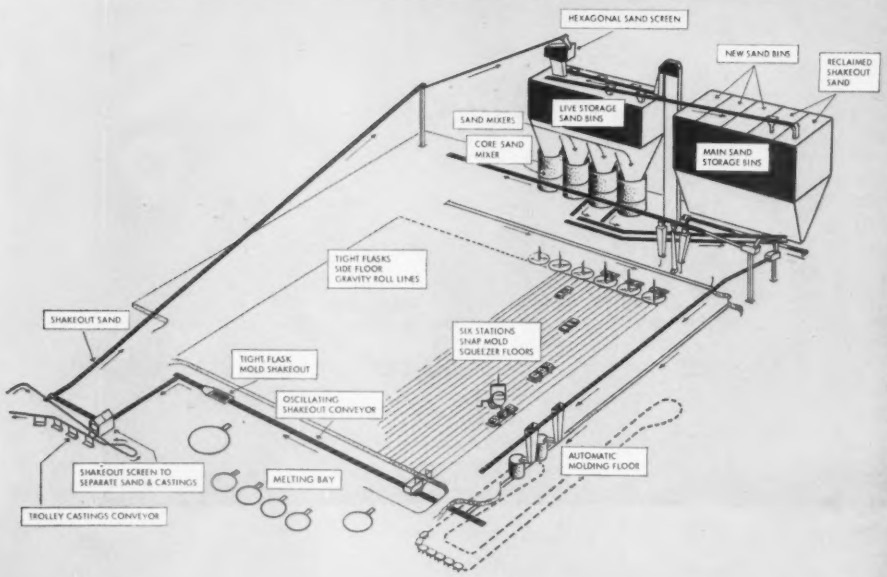




Turntable brings flasks to stationary slinger for ramming. A rollover machine removes mold from turntable, draws pattern and returns it to turntable. This unit handles production and miscellaneous medium-heavy work

Several of the 12 machine stations operated in the light molding area





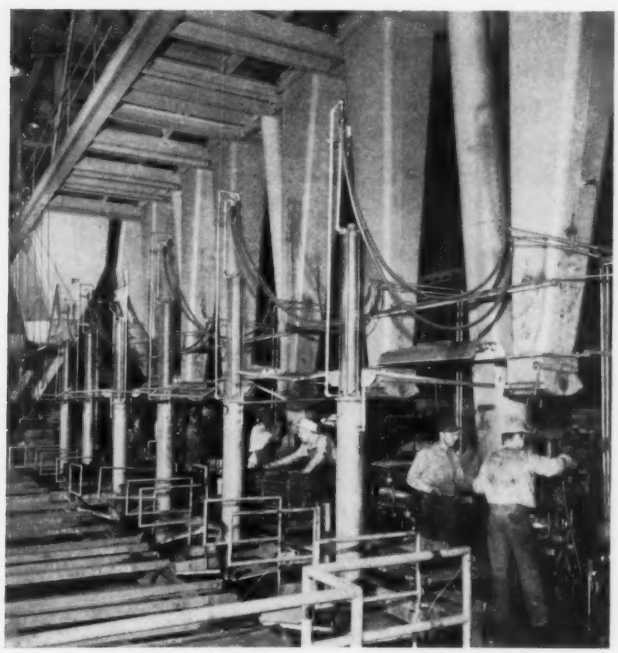
Sketch showing layout of area for production of the light castings. (Courtesy of Link-Belt)

veyors to the combination storage, pouring, and cooling area measuring 120 x 135 ft. The entire area is covered by roller conveyors or tracks for mold cars. The floor is grilled so that spilled sand, or metal, drops into a pit below the floor onto a conveyor.

A detail in this pouring floor illustrates the care that went into its planning. Walkways between the mold car tracks are depressed 10 in. so the pourer's helper does not have to lean down to place or remove mold weights. Standing erect, he can pick them off molds at his left and place them on molds on his right. Ladles ride to any position in this area on overhead monorails.

From the jolt-squeeze machines, molds are placed on mold cars and rolled to a pouring area of 7800 sq ft. Mold cars are dumped automatically and returned under the pouring floor to the elevators, which bring them back into position for reloading. The extra large pouring area provides the storage space necessary for the wide variety of molds and metal specifications.

Heavier molds are dumped by a traveling mold manipulator over the shakeout. This manipulator was designed by General Metals plant engineers, and was built by Enterprise Engine Division of the corporation. An oscillating conveyor under the floor, the same one carrying sand and castings from the automatic molding area, transfers molds to the second shakeout where sand and castings are separated. The sand is returned by a belt conveyor across the plant to the top of the building and returned to storage.



Molds from this battery of jolt-squeeze machines are placed on cars and rolled to the pouring area

Automatic Molding Area—One of the most interesting sections of the Oakland iron foundry is the automatic molding area mentioned briefly earlier in the article. Molds for automobile brake drums, hubs, and other small castings are made on this production line. Highest production achieved to date is 480 drums per hour, although 440 is nearer normal. A brake drum consists of a cast iron drum cast around a steel back (or disc) which is the center of the completed drum. The cast iron provides the friction area of the brake drum.

Two automatic jolt-squeeze units ram the drag and the cope. These units use 600 tons of sand in 8 hours supplied by two mullers.

Leaving the machine, the drag moves along a roller conveyor where the drum's steel backs are placed in the mold. Brake drums are made two to a mold. When the drag reaches a position opposite the cope machine, the cope is automatically placed over the drag and clamps are set. Then the molds are pushed by rams off the roller conveyor onto car conveyors.

There is a variable speed drive on the car conveyor. At the point of transfer from the roller conveyor to the car conveyor, the returning ram actuates a micro-switch which signals the molding units, and the cope and drag ramming cycle is repeated. A completed mold is produced on the average of one every 15 seconds.

Monorails carry 500-lb pouring ladles from the holding ladles located at the cupolas nearby. Molds are poured by hand on the move as the mold cars travel along. The cars travel outside the building to complete a 21-minute cooling cycle. Re-entering the building at the shakeout, the cope and drag are separated mechanically. Empty flasks are pushed through an air vibrator for removal of excess sand, and are returned by gravity conveyor to the ramming units. At the shakeout, castings and sand fall into a 36-in.-wide oscillator conveyor for a 150-ft ride to a vibrator shakeout for the separation of sand and castings.

Castings are then dumped onto a pallet conveyor for transportation to the cleaning room. The pallets hang from a monorail. Cooling takes place during this 50-minute ride. In the cleaning room, castings are dumped automatically onto a ten-station despruing and sorting table. Sprues are dropped into bins under the sorting table and returned to the scrap yard by trolley conveyor.

After sorting, castings are distributed either to the continuous centrifugal shot blast cabinet, or to barrel machines where they are cleaned. Finally comes inspection and palletizing for shipment.

Modern Coremaking — There are two main corerooms—light and heavy. Prepared core sand is delivered by an automatic monorail dispatch unit to 14 stations in the light and heavy corerooms.

Molds for automobile brake drums are made on this automatic machine. Steel disc (foreground) is placed in mold and iron is cast around it

The sand mill operator predetermines the dumping position through an electrical control system.

Core blower stations and core benches are separated by a belt conveyor which transports finished cores to the vertical baking oven. After being baked, they travel to the finishing and core setting stations. Rack-type, two-compartment ovens also are used for core baking.

In the 60 x 120 ft heavy coreroom, cores are made with a stationary sandslinger, and are handled by a rollover-draw machine to the finishing floor. A 10-ton overhead crane in the heavy coreroom extends into the heavy molding bay.

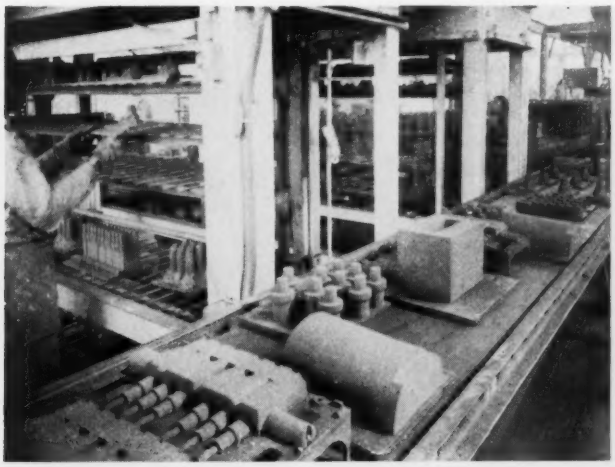
General Metals is doing considerable work with shell molding, and plans to add new shell molding equipment soon.

Melting—Melting facilities are very flexible and are designed to produce gray iron (including nodular), malleable iron, or steel castings. Steel, of course, is made in the electric furnace. Malleable is made by duplexing from the cupolas to the electric furnace. Iron is made in both the cupolas and electric furnaces and is an inoculated process cast iron produced under license from the Sorbo-Mat Process Engineers, St. Louis.

Sulphur reduction in production of nodular iron is achieved by a carbide injection process, but the company is also working with basic cupola practice.

The new plant has two electric furnaces—one 9-ton-per-heat unit and one 4-ton-per-heat unit. Four cupolas with 72-in. shell diameters are lined to 36, 42, and 48 in. depending on metal demands. Make-up and charging is completely mechanized.

Some mention has been made of the method of handling metal to the various pouring floors. The 10 and 30-ton bridge cranes handle ladles for pouring on the heavy molding floor. Pouring on the automatic molding line and the light molding floor



Belt conveyor transports cores to vertical baking oven, and then to the finishing and assembly area

is by 500-lb ladles on monorails. The latter ladles are filled from a large holding ladle located in the melting area. The pouring area is equipped with adequate monorails so that double handling of finished molds is eliminated and maximum use is made of pouring space.

Scrap Yard—The scrap yard which supplies the furnaces is equipped with a 10-ton overhead crane. Nine bins are used for scrap and pig iron, two bins for coke and one for limestone.

Cupola metal charges are made up on a platform over the bins, dumped into drop-bottom buckets, and moved by trolley to the coke bins where coke and limestone are added. The charge is rolled off the car by hydraulic lift onto a gravity roller conveyor, which takes the charging bucket under the charging crane.

The charging crane picks up the drop-bottom charging bucket and lifts it up to the charging door of the cupola where it automatically drops its contents into the cupola.

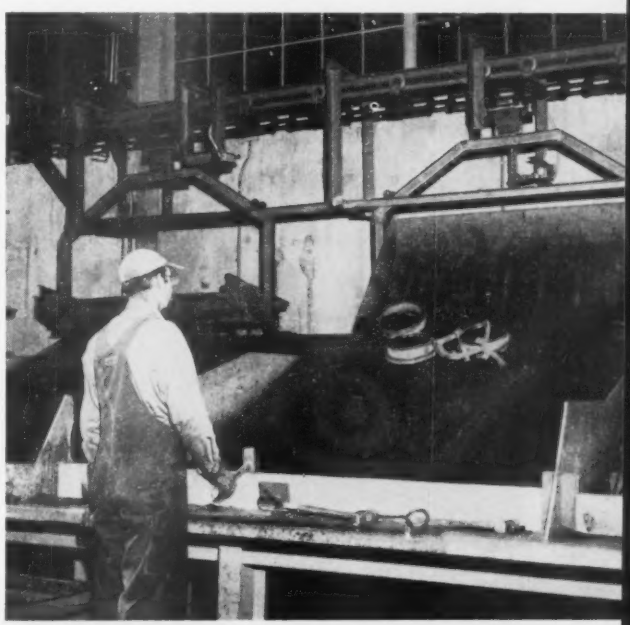
Heat Treating—Heat treating facilities in the iron foundry, a $1 million installation, include eight bell-type, electrically heated ovens. Of these units, three are tempering recirculating ovens with a 1300°F maximum temperature, and five are for normalizing with an 1850°F maximum temperature. The ovens take 86 x 129-in. trays, which in usual practice are not loaded more than 40 in. high.

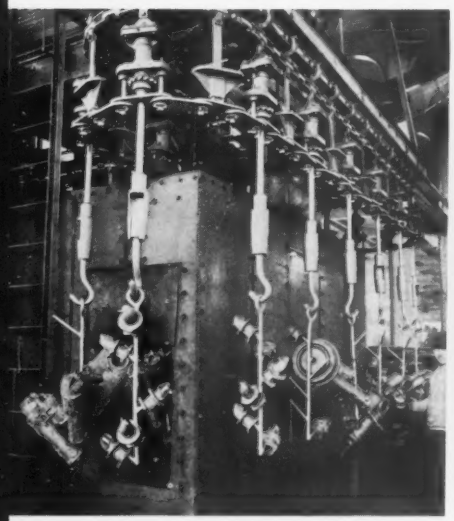
A generator produces up to 2000 cu ft per hour of neutral gas for atmosphere control in the bell furnaces to prevent scaling. The generator produces neutral gas by an absorption and drying process. A large transformer station is connected to the heat treating department. The heat treating department also has four gas ovens for annealing.

Trays are handled in and out of the ovens and to the quench tanks by a fork-lift type manipulator designed especially for this foundry. Two

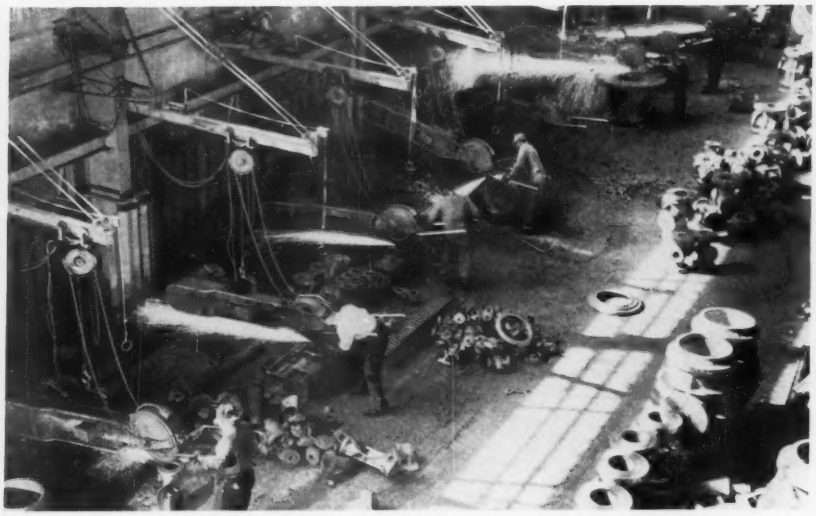
Large cores are made by stationary sandslinger and are handled by this rollover-draw machine

Castings travel from the shakeout on trays of overhead trolley conveyor to the cleaning room

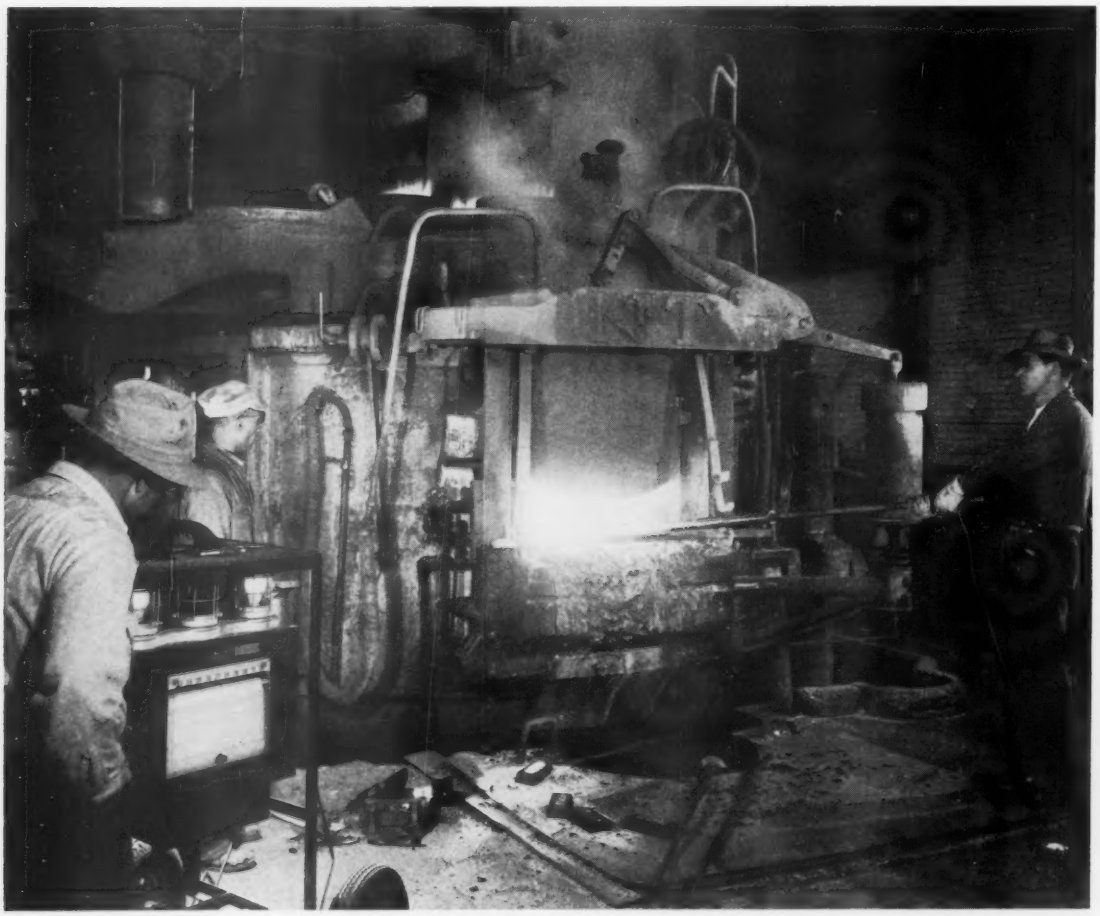




Many different types and sizes of castings move continuously through this airless blast cabinet



Battery of swing frame grinders working on larger castings in the heavy cleaning bay



Checking the temperature of a heat at one of the electric furnaces. Immersion thermocouples are used in both the iron and steel foundry

wheels travel on a floor rail and two travel on a rail over the ovens. The main 90-degree angle bridge is 33½ ft long and 28 ft high. The lift can carry up to 8 tons. Normal running speed is 180 fpm. When the manipulator is spotted in front of any given oven, raising and lowering the bell over the oven is controlled by the manipulator operator from his control panel.

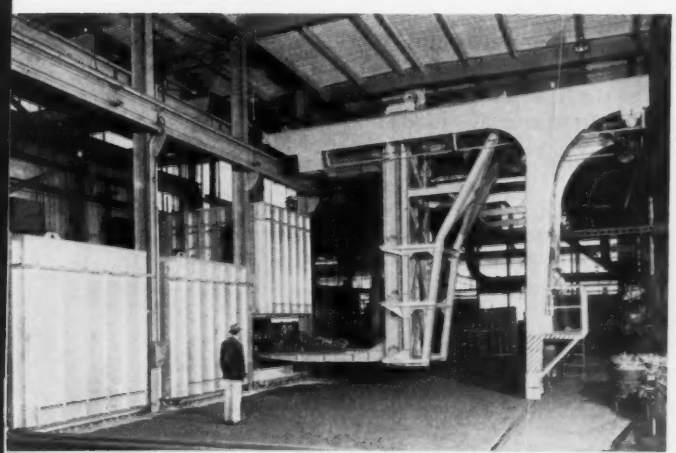
Two water quenching tanks measure 9 x 18 ft with depths of 10 ft and are equipped for pump agitation of the water. Transfer car tracks flank the heat treating area for receiving and delivering loaded trays. The tracks extend outside for air quenching.

Dust Collection—Twenty-four powered roof ventilators maintain a continuous negative pressure in the building. Seven water-type dust collectors assure the maintenance of safe, hygienic, and pollution-free ventilation throughout the foundry. Water from the system flows into a settling tank in the yard at the rate of 500 gal a minute.

Power—The plant has a power substation which takes 12,000 v from the main line. Five transformers of 1500 kva capacity step-down to 440 v for use throughout the plant. Generator sets provide direct current for all overhead cranes.

The Steel Foundry—This article is primarily a description of the General Metals iron foundry, but a few words on the steel foundry are in order. The steel foundry was built during World War II. It forms the west leg of the U-shaped foundry building and includes 110,300 sq ft of floor space. This building also houses a large machine shop for maintenance service, and a compressor room.

The steel plant has a 45,000-lb arc electric furnace for the basic process, and a 13,500-lb acid process furnace. High and low alloy and carbon steel are made in these top-charged furnaces. A 30-ton crane, with a 5-ton auxiliary equipped with magnet for scrap yard work, serves this melting bay. The scrap pile is located at the open end of the bay.



This especially designed manipulator handles castings in and out of ovens and quench tank

The melting department has an immersion thermocouple. Two induction furnaces with capacities of 500 and 1000 lb also are used to melt stainless and heat-resistant steel.

Diversity of product is characteristic of the steel foundry as well as the iron foundry. At present some of the bigger items are bodies and plugs for water, oil, and gas valves weighing about 8000 lb; turbine castings; cast armor transmission housings for large military vehicles; and multistage pump housings weighing up to 1½ tons cast in 11 to 13 per cent chrome or high alloy. Steel castings also are made weighing as little as ¼ lb.

General Metals is a qualified producer of cast armor. Since World War II the company has been a prime West Coast source for armor castings for Army Ordnance.

The coremaking area is divided into heavy and light core bays. Gate cores and shell molds are made in a separate room off the light core bay. The corerooms have the usual floor and bench coremaking equipment. Jolt-rollover machines and core blowers are used. Equipment includes a battery of four rack ovens, one large car type oven, and one conveyor type oven for drying cores after pasting and for small and medium cores. Sand is supplied from a muller located in the coreroom. Sand delivery to bench coremakers is by monorail bucket.

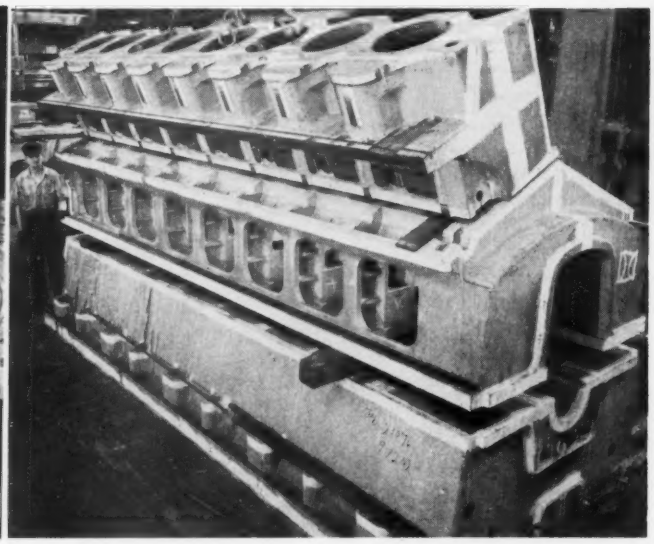
The molding area consists of a large floor and pit molding bay, and a light molding bay. The heavy molding bay has four bridge cranes: a 30-ton, a 20-ton, and two 10-ton cranes. Principal equipment consists of two mobile slingers and two large rollover-draw machines. A pit measuring 50 x 15 x 10 ft is equipped with a gantry crane. Sand is prepared by another muller, and sand delivery is by overhead conveyor to facing boxes and bins, and to overhead hoppers for feeding backing sand to the slingers.

The light molding floor has 14 molding stations for mounted work or boarded patterns and two loose stations for unmounted patterns. Smaller molds are pushed away from the machines on roller conveyors where finishing and pouring take place. Castings poured in this bay range from ¼ to 1000 lb. Monorail ladles of 300 lb capacity are used for lip pouring small molds, while medium to large molds are bottom poured. A 10-ton overhead crane serves this bay for handling large molds and for transferring molds and castings to the shakeout.

From the 4 x 6-ft shakeout, castings travel by apron conveyor to the cleaning room. Castings from the heavy molding floor are handled by cranes from a large shakeout. Sand from the shakeout stations is conveyed by belt over magnetic pulleys to remove metal, and is sifted through screens to overhead storage.

The steel foundry cleaning bay is at the end of

Magnetic particle testing is one means used to control quality. This is a steel casting



Base, crankcase and one of two cylinder blocks for a large V-type, 16-cylinder diesel engine

and at right angles to the steel foundry proper. The steel cleaning bay and the heavy iron cleaning bay connect and in effect are one long bay extending along the bottom of the big U-shaped building which forms the combined iron and steel foundry. The shipping dock is in the center of this long cleaning bay. Iron castings feed in from the iron side and finished steel castings from the steel leg of the U.

Cleaning equipment includes a hydraulic blast room for large castings. The sand is scrubbed, dried, and screened for use as facing sand. Other cleaning facilities include centrifugal shot blast rooms, rows of chippers, swing grinders, electric gouging equipment, and the usual cleaning apparatus. Magnets handle large castings throughout the cleaning operations.

Testing and Inspection—Quality control is the keynote of the entire foundry operation. Laboratories are maintained for complete chemical, physical, sand testing and inspection functions. To assure maximum quality production, a final testing is provided by a million volt x-ray machine and radioactive cobalt apparatus. Magnaflux testing is used as well.

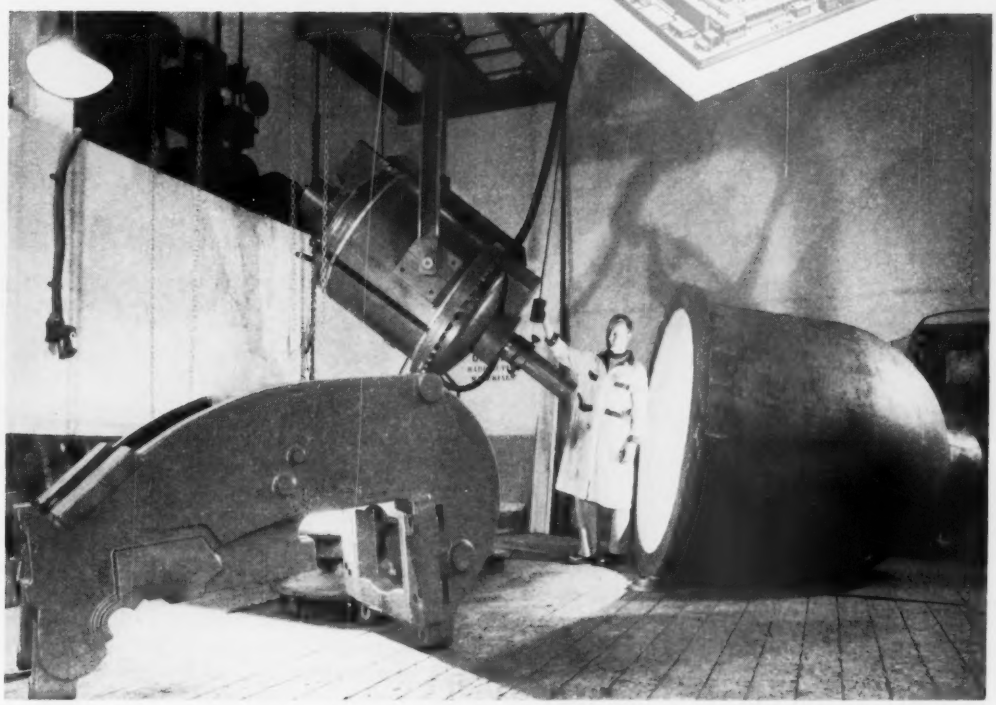
Plenty of Space—About 271,000 sq ft of floor space is under roof in the combined steel and iron foundry. The big U-shaped building sits in the middle of 95 acres of company land. President Bill Butts, when asked, "Why so much land?" said, "The West is growing rapidly, and, naturally, we have an eye on the future."

The plant is located at 85th Ave. and Edes St. near Oakland's south city limits, and is directly east of the Oakland Municipal Airport and a planned new industrial park. The company's property flanks the East Shore Freeway (State Highway 17) which runs north and south on the Oakland side of San Francisco Bay. Besides the convenience of this new high-speed freeway for trucking, the Oakland plant is served by three rail spurs, two of which enter the steel plant and the other the iron plant.

Four Divisions — The new Oakland gray iron foundry is the latest in a chain of plants operated as the Foundry and Forge Division of General Metals Corp., which, in addition, includes a mechanized malleable iron foundry in Los Angeles and forge shops in Los Angeles and Houston.

Other General Metals operations are the Enterprise Division, building heavy duty diesels, indus-

Shown below are some of the smaller miscellaneous types of castings made at Oakland

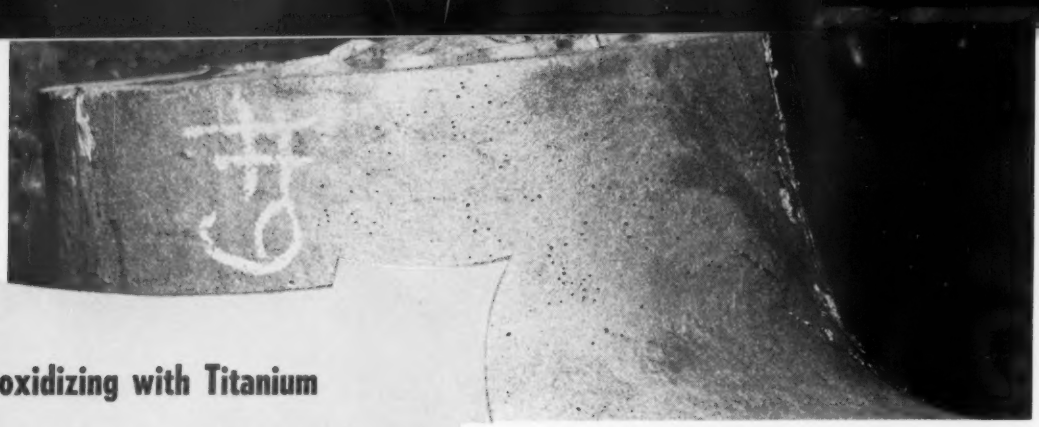


Final testing of large castings with million-volt x-ray unit. Radioactive cobalt also is used in testing

trial burners, and process machinery at plants in San Francisco and South San Francisco; the Adel Division, which makes precision hydraulic equipment for aircraft at Los Angeles and Huntington, W. Va.; and the Pacific Fittings Division plant at Hollydale, Calif., producing pipe fittings.

Suppliers of Major Equipment for the General Metals Corp. Foundry

American Air Filter Co.—Dust collectors.
American Bridge Division, United States Steel Corp.—Electric furnace.
Beardsley & Piper Division, Pettibone Mulliken Corp.—Sandslingers, plate feeders, turntable, mullers.
Cleveland Tramrail Division, Cleveland Crane & Engineering Co.—Pouring monorails.
Crane Co.—Pneumatic sand conveyors.
Foundry Equipment Co.—Core ovens.
Foxboro Co.—Airblast controls.
Gardner-Denver Co.—Air compressors.
General Electric Co.—X-ray equipment.
Harnischfeger Corp.—Overhead bridge cranes.
International Molding Machine Co.—Rollover machines.
Jeffrey Mfg. Co.—Mold, car conveyor.
Lectromelt Furnace Co., Division of McGraw Electric Co.—Electric furnace.
Link-Belt Co.—Oscillating conveyors, shakeouts, pallet conveyors, sand handling and storage, annealing oven manipulator.
National Engineering Co.—Sand mixer.
Pangborn Corp.—Blast cleaning equipment.
Roots-Connersville Co.—Cupola blowers.
San-Blo Division, Federal Foundry Supply Co.—Core blower.
Claud B. Schneible Co.—Wet dust collectors.
Shanafelt Mfg. Co.—Flasks.
Simplicity Engineering Co.—Dual shakeout.
SPO Inc.—Automatic molding unit and molding machines.
Sterling Wheelbarrow Co.—Flasks.
Syntron Co.—Vibratory feeders.
Toledo Scale Co.—Weigh scales.
Westinghouse Electric Corp. — Electric annealing ovens, transformers, electric motors.
Wheelabrator Corp.—Blast cleaning equipment.
Whiting Corp.—Cupolas.



Deoxidation with titanium can eliminate small gas holes or "pin holes" like these in steel castings

Deoxidizing with Titanium

Eliminates Pin Holes

By R. D. AHLES, *Manager*
Product Engineering, Foundry Dept.
General Electric Co., Schenectady, N. Y.

PRODUCERS of quality castings long have been plagued by the presence of small gas holes in sand castings. The extent of these small holes varies from casting to casting and from heat to heat. Because of their appearance on the surface of castings, the general foundry name for these clusters of gas holes has been "pin holes."

The defects can be much larger than the name implies, however, as can be seen in the accompanying illustration. This pin-hole condition moderately affects the mechanical strength of castings and generally is removed from highly stressed castings. Even if stresses are not critical, pin holes detract from the appearance of castings and are undesirable for that reason alone.

Remedy Has Drawbacks—Foundrymen have established the fact that most pin holes can be minimized or eliminated by adding to the melt a small amount of aluminum, calcium, titanium or other elements having a strong affinity for oxygen. Even these small amounts of deoxidizer (½ to 2 lb per ton), however, can lower mechanical properties seriously. Because of this deleterious effect, manufacturers of high-temperature equipment have avoided use of these deoxidizers and have accepted as normal the resultant repairing of pin-holed areas.

Recent work at General Electric Steel Foundries on deoxidizing with titanium, however, has shown improved quality in chrome-moly and chrome-moly-vanadium steel castings. The alloys included B50A237K containing 0.15-0.25 C, 0.30-0.50 Si, 0.60-0.80 Mn, 0.85-1.15 Cr, 0.90-1.20 Mo, 0.010 max S, 0.025 max P and 0.30 max Ti, and alloy B50A224B containing 0.15-0.20 C, 0.30-0.50 Si, 0.60-0.80 Mn, 0.85-1.15 Cr, 0.90-1.20 Mo, 0.010 max S, 0.025 max P, 0.15-0.25 V and 0.030 max Ti.

Quality is not affected by residual titanium between 0.01 and 0.03 per cent. But since increasing amounts of carbon and sulphur do lower quality, they are held to an average of 0.165 C and 0.008 to 0.010 S. When the decision was made to aim for lower carbon contents, chromium was raised from 1.00 to 1.05 and molybdenum from 1.00 to 1.10 to insure good hardenability.

Low Sulphur a Requisite—Metallurgists at General Electric use a very basic and carbidic second slag practice, and every effort is made to mix the slag with the steel during the tapping operation. The low sulphur levels of 0.008 to 0.010 have been found to be necessary to get optimum properties (100,000 tensile strength and 60 per cent reduction of area) in conjunction with the titanium addition. If sulphur content reaches 0.015, reduction of area seldom will exceed 50 per cent, while 0.025 sulphur results in ductilities of approximately 40 per cent reduction of area.

The first 100 heats produced with titanium were deoxidized in the ladle with ¾-lb titanium per ton of metal. The addition was silico-titanium. With this practice some ladle segregation of titanium was encountered. This condition led to the present practice of furnace additions of the same alloy at the rate of 1¼ lb per ton made about 5 minutes before tapping. Residual titanium varies from 0.010 to 0.030 with this practice, the majority of the steel containing 0.020 to 0.030.

Heat Treatment—Normal heat treatment for these alloys is 1922°F for 12 hr followed by an air quench and a draw at 1274°F for 28 hr. With this treatment some difficulty was encountered with steels containing 0.012 or less titanium. Sometimes they had extremely fine grain size with resultant low hardenability and the presence of ferrite. Austenitizing these low titanium steels at 2012°F restored the grain size and hardenability. With titanium levels exceeding 0.015, however, this difficulty is not encountered, the reverse situation of extremely coarse grain size being the case.

Current practice, therefore, indicates that metal for high-temperature and pressure application castings can be deoxidized with titanium to eliminate pin holes with little or no sacrifice in mechanical properties. The small amount of titanium used is adequate to eliminate pin holes and produces better appearing, higher quality castings. Also appreciable cost reductions are achieved by reducing scrap castings and minimizing defect repairs.

—The End

Planning a Layout for the BRASS FOUNDRY

By HARRY ST. JOHN
Foundry Consultant

In this article, No. 20 in his series on *The Brass Foundry*, Mr. St. John explains in detail the factors which must be considered in the layout of a small brass jobbing foundry

THE best layout for a foundry depends on its size, location and the character of its product. If it is a captive foundry, the bulk of its production—perhaps all of it—will go to the manufacturing company of which it is a part. Its market is established. The kind of castings needed is known, and both the volume required and probabilities of expanded volume can be estimated with fair accuracy.

A jobbing foundry has quite a different set of problems. Its customers and the character of their requirements are variables. The likelihood of expansion is a wide-open question. The captive foundry will probably be located as an integral part of its manufacturing sponsor; the jobbing foundry can select its location. In the arrangement of working areas and the choice of equipment the two have much in common.

The manufacturing company with casting requirements has one decision to make peculiar to its own situation. Will it be better to operate its own foundry or to buy its castings? If it already has a foundry, should the necessary investment be made to modernize it or should the foundry be abandoned and castings purchased from an outside source? Because of varying circumstances there can be no universal answer to this question. Unless a captive foundry can be operated at a minimum daily melt of 5000 lb, however, it is difficult to keep labor and investment costs at an economical level. If there is a competent jobbing foundry within reasonable distance, its services should be given serious consideration. Even at somewhat higher production this possibility should be explored carefully.

Room To Grow—In choosing a foundry location, or in acquiring a foundry already in existence, certain fundamentals must be observed. There should be room for expansion. A railroad siding and space for loading and unloading trucks are essential. An ample supply of water and electricity will be needed, and the availability of gas and fuel oil should be checked. Inexpensive drainage and sewer connections will be required. An adequate local supply of common labor is a factor. All foundries give off a certain amount of dust and fume; their complete suppression is costly. In this respect, local ordinances and residential conditions need to be investigated. It goes without saying that there must be a market for the foundry's product and part of this ought to be within short trucking distance.

Let us assume that we are thinking of a brass jobbing foundry that is expected to produce an average of 5000 lb of rough castings a day. At times this might drop to 2500 lb or go up to 7500. The daily melt will vary from 5000 to 15,000 lb, average about 10,000. Although provision should be made for larger castings, let us suppose that the bulk of the production will be in castings small enough to fit a 12 by 18 in. mold and that the average weight of metal melted per mold will be 12 lb, of which 6 lb will be castings. The maximum daily requirement will then be 1250 molds. To provide for contingencies eight molding positions should be planned. A point to remember here is that a second shift to take care of maximum production is less feasible in a jobbing foundry than in a captive foundry. The latter need only provide enough space and equipment to match its average production.

A Suggested Layout—The accompanying diagram illustrates a suitable arrangement for a foundry of the size we are considering. Points of the compass have been included in the diagram merely to aid in the description. It is obvious that the actual arrangement for a specific foundry will depend on its surroundings. The need for a railroad siding and access for trucks has already been mentioned. Some of the metal will probably be received by truck. If castings are to be machined, the machine shop should be located south of the building shown in the diagram, and the alley between buildings should be at least 30 ft wide. The foundry building will need to be about 350 ft long and 80 ft wide.

The layout is planned so that heavy and bulky materials such as metal and sand will move in short steps and as nearly as possible in a straight line. To minimize the employment of wheelbarrows and shovels, liberal use should be made of electric hoists, electric tramrails, roller conveyors, power conveyors and power trucks.

The greatest bulk of sand will go from Sand Storage(1) to the Coreroom(6), a lesser amount to the Sand Conditioning Area(3). In the latter this new sand will be mixed with used sand from the

shakeout, conditioned and returned overhead to the molders' chutes. Molds will be shaken out along the center aisleway in the Molding Area(7). Castings are conveyed on skids by power truck to the Cleaning Room(10) while the used sand is carried by an underfloor power-driven conveyor to the Sand Conditioning Area(3).

Metal will be delivered in weighed amounts from Metal Storage(2) to the Furnace Room(12), preferably in buckets traveling on an overhead rail. Current metal requirements are to be stored on a charging platform north of the line of furnaces. Gates and sprues cut off from castings are weighed in the Cleaning Room(10) and delivered to the Furnace Room(12) without first going to Metal Storage(2). Machine turnings and metal-bearing wastes will go to Metal Recovery(4) and, after treatment, to Metal Storage(2), some for ultimate use in the furnaces, some for sale to refiners. Back tracking of metal and waste materials is accomplished by means of a power truck in the center aisle.

The sand and metal storage and metal recovery may be considered as a unit and can be taken care of by two men. A car unloader for the sand and a power-lift truck for the metal will be needed. There must be a good platform scale for weighing metal in and out. Metal recovery will require a ball mill, concentrating table and, in combination, a rotary drum for drying turnings and concentrates and a magnetic separator for removing tramp iron.

Labor Requirements—Possibly as many as six people will be needed in the Coreroom, depending on methods used. Methods which may be used will be described in another article. They range all the way from conventional hand-made cores, bonded with oil, to the new carbon-dioxide process which needs no baking oven. It would be unwise at this point to recommend an exact procedure. Coremaking practice is in a state of transition and much depends on local conditions and the character of the product. So far as possible, all production cores should be blown rather than packed by hand.

If jolt-squeeze or plain squeeze molding machines are employed, five molders should be more than sufficient for the average production of 5000 lb of castings per day. Space is provided for three additional molders. Each molding unit should be allowed 8 ft of east and west space and should be equipped with two gravity-conveyor molding lines, each with a capacity of 20 small molds. The aisle south of the molders provides for the delivery of cores and incidental supplies. It is important to serve the molders in every way possible so that their time will be devoted to molding. Most of this service will be performed by laborers of whom three will be needed. Two more are listed for general work and to substitute for absentees.

The equipment for sand conditioning will include a muller, an aerator, conveyors and elevator to convey sand from shakeout to conditioning area and thence to molders' chutes. One man will be able to operate the equipment.

It is assumed that sufficient metal for the bulk of the production will be melted in some type of

1. Sand storage.
2. Metal storage.
3. Sand conditioning.
4. Metal recovery.
5. Boiler room and mechanic's shop.
6. Coreroom.
7. Molding area.
8. Pattern storage.
9. Superintendent's office.
10. Cleaning room.
11. Inspection.
12. Furnace room.
13. Test room.
14. Receiving.
15. Stores.
16. Shipping.
17. Locker room.
18. Washroom.
19. Lunchroom
20. Offices.

furnace using pouring ladles. This could be electric or crucible tilting. The number of melters needed will vary from two for electric melting to three for crucible melting, or four if crucible liftout furnaces should be selected. In any case a couple of small crucible tilting or liftout furnaces should be provided for small lots of unusual alloys or to take care of maximum production. Furnaces rarely used should be of an inexpensive type. One of the melters will assist the pourer in gaging the metal temperature, skimming, etc. Only one pourer will be needed, assuming that one-man pouring equipment is installed.

In the Cleaning Room, castings will be cut from the gates by means of punch-press shears, abrasive wheel and belt saw. A blast mill is provided for cleaning and grinding wheels are used for removing gate stubs and fins. Three or possibly four men will be needed to operate this equipment. One additional man will inspect castings before shipment to delivery point.

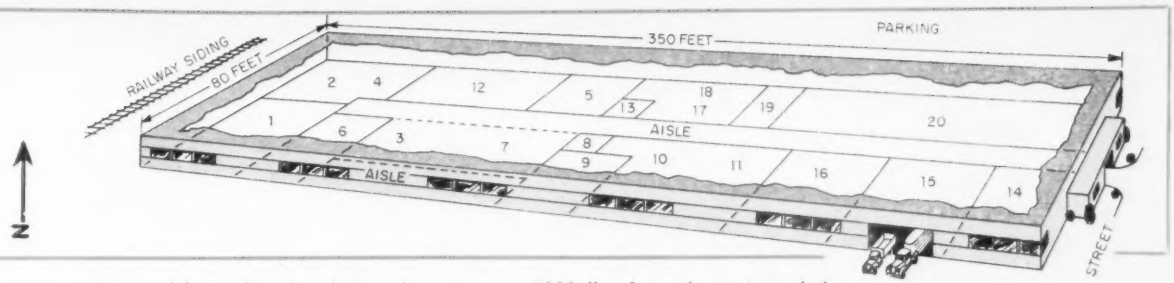
An oil or gas-fired boiler will supply heat needed during the cold months and may also operate an air compressor, although the latter may very well be driven by electric power. A mechanic, who at times will need a helper, will operate the boiler and perform needed maintenance work. It is suggested that preventive maintenance and periodical overhauls be carried out during slack times when surplus labor is available. The accountants won't like this because of the effect on overhead but it's the way it should be done.

It is felt that a small foundry cannot profitably support its own chemical laboratory. In any industrial center there are commercial laboratories which give prompt and accurate service in chemical analyses, test-bar pulling and the like. However, any foundry needs a test room for sand testing, fracture examination and small test melts. For the latter a crucible furnace of 30 to 40 lb capacity should be provided. One man should be assigned to test work.

One man should be able to serve as shipping clerk, receiving clerk and keeper of miscellaneous stores. One janitor will take care of locker room, wash room and lunch room.

The foundry superintendent will need a foreman assistant who will have charge when the superintendent's duties call him elsewhere or whenever he is absent for any reason. A clerk will also be needed for record keeping.

Requires 35 Men—A check of the foregoing will show that we have listed 35 men, including the two supervisors and clerk. At lower rates of production,



Layout of brass foundry designed to average 5000 lb of rough castings daily

savings can be made by combining jobs. At this point the importance of incentive rates of pay should be noted. As production increases, a man whose pay depends on the amount of his production will not be so inclined to think that he is overworked. As production decreases, he will not object to doing work not usually included in his regular job.

Lockers and sanitary facilities should be provided for 45 men. This will take care of the maximum requirements which may occasionally be experienced. The tabulation makes no allowance for a possible machine shop and does not include office personnel. Without attempting to specify exactly what office help will be needed it is estimated that it will amount to seven or eight people including officials.

An important consideration in any foundry, particularly any brass foundry, is heating and ventilating. Practically all brass-foundry alloys contain lead and zinc. Oxides of these metals are discharged into the atmosphere during melting and pouring. Lead, absorbed by the human body over a period of time, is a dangerous poison. The inhalation of zinc fumes seems to have no permanent effect but, in excess, causes what is often called "brass shakes." This condition, while temporary and not dangerous, results in great discomfort, loss of sleep and consequent absenteeism. Most states have rather stringent laws forbidding the taking of food in brass foundries and requiring adequate ventilation, lunch rooms partitioned off from the foundry, and ample showers and wash basins.

When outside temperatures are moderate or high, powerful roof ventilators will take care of the situation very well but, in cold weather, heating and ventilating simultaneously is a real problem. If an attempt is made to provide maximum ventilation for the whole foundry area, it becomes almost impossible to heat sufficient air to supply the ventilators. Working conditions which were once considered tolerable will no longer do. There must be a minimum of fumes and a reasonable room temperature, not lower, say, than 50°F.

Provide Local Ventilation—The best way to meet this problem is to provide strong local ventilation where it is most needed and a more moderate general ventilation for the building as a whole. Melting furnaces definitely should be hooded and, if convenient, the furnace room should be partitioned off from the molding area. Retractable hoods over the pouring lines and shakeout will also relieve conditions considerably. To make intensive localized ventilation effective it is well to furnish a supply of unheated outside air to such local areas. Otherwise heated air will be robbed from areas which need heat but not so much ventilation. An undesirable excess of air supply must be avoided by means of dampers in incoming air lines.

Ventilators will necessarily discharge dust and fumes into the neighboring air surrounding the foundry. Care must be taken to comply with local ordinances either actually in existence or likely to be passed. Prevailing winds and the character of nearby residential areas must be taken into consideration. Stacks and ventilator outlets should be high enough to insure a wide, thin distribution of effluent. Dusty air from the shakeout should be cleaned by passing through a wet collector, and grindings and grinding-wheel dust from the cleaning room should be deposited in a dry collector. Suitable equipment is available for these purposes.

The plant should have a well stocked first-aid kit and members of the force trained in its use. Someone in the plant should be responsible for the observance of safety regulations and outside arrangements made for medical and nursing service. If labor of the desired quality is to be retained there must be emphasis on safety and pleasant working conditions.

The Cost—A final question is: What will all this cost? And, of course, there can be no specific answer to cover a variety of circumstances. Consequently, no attempt will be made to itemize. However, to build and equip such a foundry as has been described, provide sufficient supplies for a start along with the necessary working capital, will require an investment close to $450,000.

A foundry capable of making satisfactory castings can be built and equipped for considerably less than this figure but its use of labor will be excessive. Unless circumstances are unusually favorable it will be hard pressed to make a profit. It is likely that labor saving will be increasingly important as time goes on, but it must also be remembered that expensive equipment will not pay its way if it cannot be kept busy. It is possible to equip a foundry so that most of its operations are completely automatic and workmen become little more than button pushers. But, unless carefully planned, maintenance costs and burden charges will more than offset the labor saving. It is unlikely that any brass foundry is large enough to afford going to extremes in this respect. —**The End**

Investment "X" Process

Makes Larger Investment Castings Possible

Investment "X" process has been used to produce castings which weighed 110 lb as cast and 56 lb as finished. Here's how it works

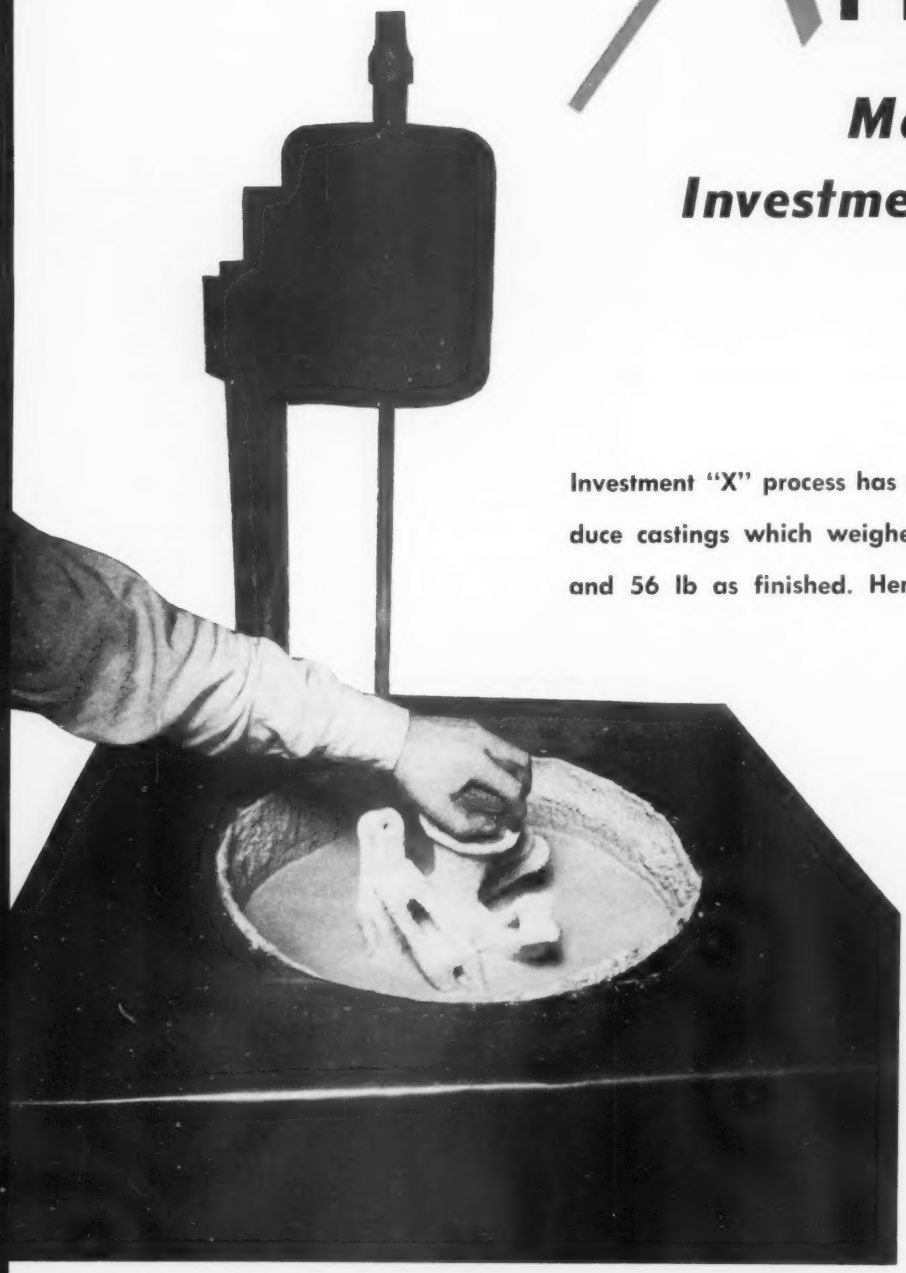


Fig. 1—Dipping wax pattern into ethyl-silicate-bonded slurry. Rotating dip bowl and stirrer designed for process maintain slurry consistency

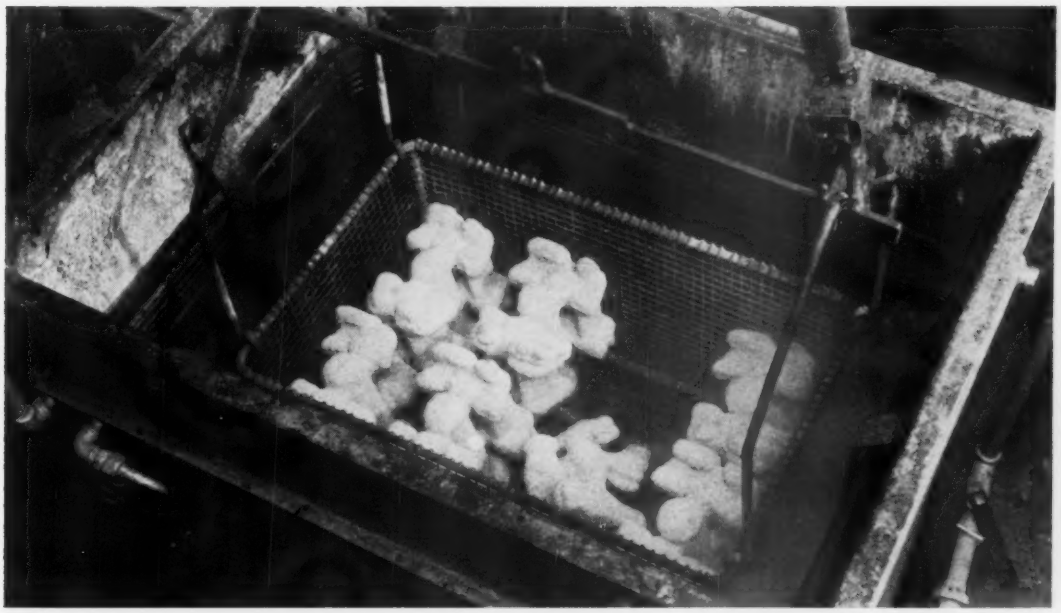


Fig. 2—With the Investment "X" process, wax must be removed from the mold in a solvent vapor bath. Trichlorethylene vapor is ideal for the purpose

THE Investment "X" process is one of the techniques of producing castings by the lost-wax method. It was developed in the Precision Casting Shop of Metropolitan-Vickers Electrical Co., Manchester, England.

Although the process has potential for producing castings larger than those which can be made in some other types of investment molds, there are cases where it will not produce certain castings that the other methods will. For example, a multibladed rotor with blades ⅛ in. apart cannot be made by the Investment "X" process. A shell cannot be built up on the wax blade surface. Also, where parts are small—less than 3 in. in longest dimension—the solid mold technique, using stack molding patterns, is better.

A Dip-Coating Process—One-piece shell molds are made by spray-coating or dip-coating a wax pattern with a permeable refractory slurry, backed by a large-particle-size packing investment. After the shell is formed, the wax pattern is removed by immersion in nontoxic trichlorethylene vapor. In some instances, particularly for nonferrous castings, the molds are fired and poured without supporting media. When molds are to be pressure-cast with a centrifuge, the molds are packed in metal containers with a refractory mixture consisting of sand and molochite. As an economy measure the molochite can be replaced with granular material obtained by crushing old molds.

Formation of a shell by dipping is shown in Fig. 1. Composition of the first coat slurry was developed by Metropolitan-Vickers. It is not stuccoed, although the second and succeeding coats are showered with molochite in a stucco-rain machine. The unstuccoed first coat is said to give a better casting surface finish for most alloys. Multiple dipping also produces a high mold strength which is responsible for a low percentage of scrap castings.

Each refractory coating is dried in an air tunnel. Most patterns are dipped about six times. Large patterns, however, may receive eight dip coats. Mold thickness varies with pattern assembly size from ¼ to ½-in. Metropolitan-Vickers has produced castings weighing 56 lb with a total cast weight of 110 lb.

Patterns Are Dissolved—Dipped patterns then are placed in a wire basket for submersion in a trichlorethylene vapor bath for wax removal as shown in Fig. 2. The vapor permeates the porous shell and immediately dissolves the wax faces adjoining the investment, before the heat of the solvent vapor expands the wax. If the mold cavity

Fig. 3—Turbine blade assembly from which wax has been removed. Partial sectioning shows mold cavity

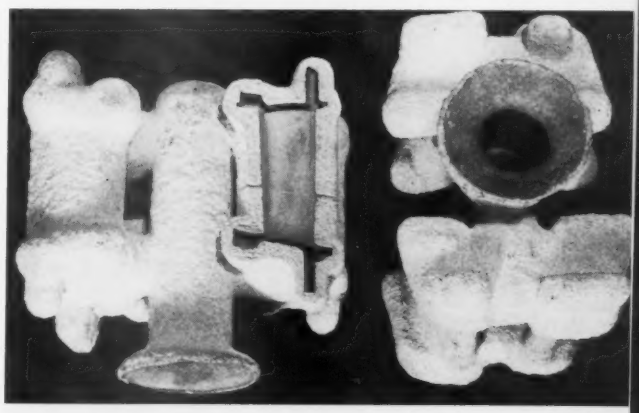


Fig. 4—After the molds have been dewaxed in trichlorethylene vapor bath, mold cavities are cleaned with a suction pipe, as shown here

wax will not drain by gravitational flow, it will be removed by solution treatment through the permeable mold wall. A mold of 15-lb capacity can be dewaxed in 30 to 45 minutes. Fig. 3 shows a turbine blade assembly after wax has been removed. (It is partially sectioned to show the mold cavity.)

Wax dissolved in trichlorethylene drains into the bottom of the tank and gradually accumulates. Periodically, the wax solution is transferred from the dewaxing tank into a distillation tank and heated to approximately 175° F by high-pressure hot water passing through a tubular system in the bottom of the tank. Trichlorethylene driven off in the form of vapor condenses on cold water pipes coiled inside the top of the tank and is collected in gutters below the pipes. The recovered trichlorethylene flows from the gutters into a container and is reused. The wax is filtered and used again to make new patterns. The recovered wax may be reused indefinitely with satisfactory results.

After dewaxing, mold cavities are cleaned with a suction pipe as shown in Fig. 4. Molds may be poured supported or unsupported, depending on the type of metal and the casting method to be used. A cover of stainless steel sheet is placed over the sprue after the mold is cleaned, and molds are heated to approximately 1600°F in an oven prior to pouring. The heat treatment promotes adequate mold strength. Then the temperature of the mold may be raised or lowered to that desired at the time of pouring.

Remove Castings Easily—During heat treating the sand in the back-up material frits, thereby converting a relatively fluid mold support into a solid one which will withstand casting stresses. After the mold is poured and has cooled, the sand "unfrits" and the contents of the container can be poured out easily. The back-up mixture of sand and molochite can be reused. The shell investment then is separated from the casting by vibration, and the casting is cleaned by the usual methods.

Compared with solid-mold techniques of investment casting, the Investment "X" process is said to be better adapted to investing delicate or complicated wax patterns. Since the process depends

on dipping for building one-piece molds, it does not expose the wax pattern to the jarring of a vibrator or the pressure of normal solid investment. Thus, hollow patterns can be used with little risk of collapsing.

In the Investment "X" process patterns can be placed around a runner to suit optimum economical or metallurgical requirements. The economics of solid molding require that as many patterns as possible be crammed into a mold box. Furthermore, patterns often must be positioned in a certain way to avoid trapping air when investing. Also, the movement of slurry particles is unidirectional, hence packing under the wax pattern often is poor and packing on the top faces is good.

Dip coating produces a mold of fairly consistent thickness and less refractory material is required. Thus, uniform casting surface finish is said to be obtained.

Trichlorethylene removal of wax is claimed to have the advantage of eliminating mold cracking. Wax at room temperature has a substantial rigidity, and its coefficient of expansion is higher than that of the mold material. When molds are heated in an oven to remove the wax, the interior of the mold is subjected to damaging stresses.

Mold Permeability Is Uniform—Removal of wax by solution treatment also purges the mold structure, leaving only a trace of wax-trichlorethylene solution, which rapidly burns out in the mold-firing cycle. This insures consistent mold permeability. The firing cycle for Investment "X" molds is shortened to the extent that molds need only to be heated above approximately 1600°F to promote adequate mold strength, and then to select the optimum mold temperature for casting by heating up or cooling down.

Investment "X" molds are cast by gravity or vacuum or are pressure cast either by a metallostatic head or by centrifugal casting. In any case, mold designs usually incorporate a dirt trap, carefully cleaned before and after firing, to eliminate any foreign material which might get into the mold.

Another advantage claimed for the process is that the mold has a low thermal capacity which can be used effectively in the casting of long thin sections. Metals can be poured at lowest possible temperatures without getting short-run castings or interdendritic shrinkage. For this reason, vacuum casting has not been used to full extent with Investment "X", largely because its use has been unnecessary. The advantages of vacuum apply in those cases where certain sections of the casting are too long and thin for adequate feeding by other methods. **—The End**

Editors' Note: Material in this article was condensed from a paper by J. S. Turnbull, Metropolitan-Vickers Electrical Co., presented before the Institution of Mechanical Engineers in London, Dec. 31, 1954, and from a paper prepared by Mr. Turnbull and read by Noel Shaw, Shaw Process Ltd., at the Investment Casting Institute annual meeting in Detroit, Nov. 15, 1956.

Fig. 5—Assembly of dipped patterns illustrates how many small patterns can be grouped in a mold

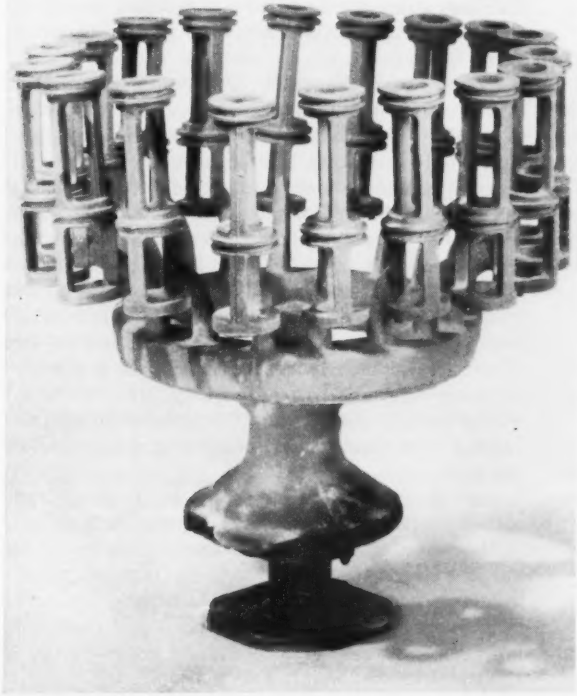


Fig. 6—As-cast assembly shows how several large patterns also can be placed in a single mold box

AN EXCHANGE OF VIEWS ON . . . .

Gases in Nonferrous Melts

Gases in nonferrous melts frequently are a problem for the foundryman. For this reason the subject is a popular one for technical discussion. In FOUNDRY for December, Vincent DePierre and Shingo Inouye described the vacuum degassing process employed by the U. S. Naval Gun Factory, Washington. Lack of full agreement with some of the points made in this article has been expressed by R. A. Colton, Federated Metals Division, American Smelting & Refining Co., Newark, N. J. Mr. Colton's remarks are presented below, and are followed by Mr. DePierre's rebuttal.

By ROBERT A. COLTON

THE ARTICLE "Vacuum Treating Nonferrous Melts" presented in FOUNDRY for December is extremely interesting and contains information that we have been looking forward to for some time. There are several points that we wish to raise with the authors because we find that we are not in complete agreement with them.

On the last page of the article (page 114), the statement is made that "Experience indicates that the major source of gases in nonferrous melts is the raw materials (ingots, metal additions and master alloys) used for melting."

We believe that the evidence given for this statement is far from conclusive. In addition, it has been the accepted opinion among foundry metallurgists and others interested in this problem that the principal source of gases in both copper-base and aluminum alloys has been the melting operation. This fact has been demonstrated conclusively.

Improvement in Properties Small—Among the interesting conclusions that can be drawn from the data presented by the authors is the fact that their melting practice must be reasonably good. In the case of the aluminum alloys in Table I, the improvement in physical properties through vacuum melting is, in many cases, of small magnitude. Even in the cases of the bronzes described in Tables II, III and IV, in many of the samples there is no tremendous improvement from vacuum degassing over normal melting practice. This would indicate that the metal was not highly gassed.

Obviously, if the gas content of the alloy is small to begin with, there cannot be any tremendous improvement from the degassing treatment. In Table IV, the physical properties of the metal without vacuum degassing would indicate that quite often tensile properties can be produced in this fashion that are at least equal to those produced by a vacuum degassed melt. This, of course, is as expected because vacuum degassing merely helps realize the potential tensile properties of the material, and good melting practice may accomplish almost the same thing.

Gas Beneficial?—We do not think that per cent porosity or density measurements are in themselves an entirely reliable indicator of the effects of vacuum degassing. It has been fairly well established in recent years that a small residual gas content in cast bronzes might actually be beneficial. This theory is based on the belief that a small amount of gas may help distribute shrinkage within the cast section so as to minimize serious shrinkage defects.

Furthermore, it is undoubtedly true that a large part of the bronze casting industry has learned to live with some gas in its metal. This segment would include the foundries that recognize the problem and have good control of their melting operation. Castings have been designed and gating has been worked out to take advantage of the residual gas contents in the metal. If completely degassed metal were to be poured into molds made with this equipment, the chances are that serious shrinkages would occur and every job would have to be regated or, in many cases, redesigned.

On the basis that the castings have been serviceable to date, and in many instances far superior to the requirements for the casting, it would seem that a small amount of gas porosity might be desirable rather than a problem. This is not to condone having gas in metal; rather it is thought that an understanding of the problem would indicate that perfection may not be desirable in every case.

Pickup from the Mold—One other thought on this subject. We are of the opinion that the ability to produce completely degassed bronze or aluminum would not solve the problem of gas in castings. As long as molds are made from material that can produce some gas when metal is run over the mold, it would seem that the lower the gas content of the metal going into the mold the greater the tendency of the metal to pick up gas from the mold. For instance, should a completely degassed heat of Navy *G* bronze be poured into a green sand mold with a normal 5 to 6 per cent moisture content, it is quite likely that the bronze would tend to pick up gas from the mold at a far greater rate than would metal with some residual gas in it.

For this reason, the ability to produce completely degassed metal may be extremely helpful in the manufacture of billets for forging or rolling, but in the manufacture of sand castings—especially in green sand—some improvement may be noted in the properties of the castings but it would be nowhere near the magnitude to be expected should the metal be poured into an inert mold.

A Matter of Interpretation

By VINCENT DePIERRE

ALTHOUGH we agree with most of the accepted general basic fundamentals given by Mr. Colton, we do not agree with his interpretations and applications of these fundamentals.

Our views on this subject will be expressed under the following topics discussed by Mr. Colton:

1. Major sources of gases in nonferrous melts. 2. Magnitude of improvements obtained by vacuum treating. 3. Use of porosity and density measurements. 4. Use of residual gases for shrinkage distribution. 5. Gas pickup from sand molds. 6. Degassed melts for sand molds and inert molds.

Major Source of Gases—We concur with the accepted opinion that the melting operation is the principal source of gases in both copper-base and aluminum alloys. The question is which melting operations—those of the producers of raw materials for remelting or those of the foundry producing castings from these raw materials or both—are the major source of gases.

Gases introduced by the melting operations of producers of raw materials for foundry remelting is retained in those raw materials, which generally are cast in chill molds. Consequently the foundry using such materials is confronted with three possible sources of gases in melting for castings: 1. Raw materials; 2. Foundry melting; 3. Mold conditions.

The only conclusive method for deciding the major source of gases is through the use of practical gas analysis equipment. The Naval Gun Factory has just installed such equipment and is now standardizing its analytical procedures. Until gas analyses are obtained, the only practical basis for determining sources of gas contamination in castings is the results obtained from experience. It has been the Naval Gun Factory experience under its standard melting practices, which Mr. Colton describes as "reasonably good," and standard mold conditions that the raw materials are the principal source of gases in castings.

On page 114 an example is given of the increased gas porosity resulting in castings from the addition of an aluminum-titanium master alloy to vacuum degassed melts under standard Naval Gun Factory melting and mold conditions. Another example is the experience of the Naval Gun Factory with different lots of copper ingots for remelting purchased from commercial suppliers under Federal Specification QQ-C-521b Grade A.

Over a large number of years the Naval Gun Factory Foundry noticed that under the same melting and mold conditions some lots of copper ingots used for making bronze (88 Cu, 9 Sn, 3 Zn) melts for sand castings gave consistently higher tension test results and sounder castings than other lots. Analyses of metallic elements showed very little difference in chemical compositions of these differently behaving copper ingots. Finally microscopic examination revealed a difference in the oxygen content of these coppers, as shown in Fig. 1. Allen (*Journal of Metals*, 1930) showed that the hydrogen content of copper melts varies inversely with the oxygen content of the melt. Therefore it was concluded that the copper ingots contained different amounts of hydrogen gases which accounted for the noticeable differences noted in tension tests and soundness of castings.

On the basis of the microscopic findings and Allen's work, oxygen was added in the form of potassium nitrate salts to molten copper, followed by zinc, tin and phosphor copper additions as described in the article, "Pressure-Tight Phosphor Bronze Castings" by Comdr. R. H. Lambert and Vincent DePierre, published in FOUNDRY, November, 1946. The marked improvements obtained in tension test properties and soundness of bronze (88 Cu, 9 Sn, 3 Zn) produced by this method are shown in the above article.

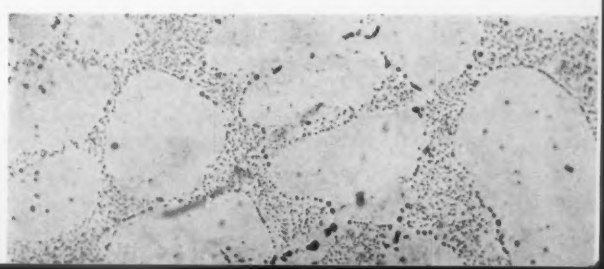
The inherent disadvantages—such as reduced crucible life and handling of salts—connected with the use of potassium nitrate made it desirable to find another method for adding oxygen. Therefore some oxygen-bearing copper was sought.

In the commercial refining of copper, compressed air is blown through the copper-bearing charge to remove impurities. The oxygen is then removed by poling with hardwood or possibly other reducing means, and refined further as required for the purpose intended. Since the copper before poling contains about 0.80 per cent oxygen, it was thought the use of this oxygen-bearing copper would be more practical to use for oxygen addition than potassium nitrate.

Many unsuccessful attempts were made to obtain this oxygen-bearing copper. Finally the Federated Metals Division, American Smelting & Refining Co. supplied the Naval Gun Factory with about 2000 lb of copper ingots with oxygen content about 0.80 per cent. These ingots were used in the place of potassium nitrate treatment and ten melts of 88 Cu, 9 Sn, 3 Zn bronze were made. The following tension test results were obtained on these heats:

Average tensile strength, psi = 53,400
Range of tensile strengths, psi = 49,000 - 54,000
Average elongation, % in 2 in. = 52.3
Range of elongations, % in 2 in. = 35-65

Fig. 1—Micrographs show variations in copper oxide contents of copper ingots bought by Naval Gun Factory for remelting. Magnification X250



The results obtained using the oxygen-bearing ingots were excellent, but attempts to purchase the ingots from commercial sources in the quantities desired were futile.

As a result of the experience with oxygen-bearing copper ingots, the Naval Gun Factory tried and adopted the use of cupric oxide additions to the copper melts. This method of adding oxygen is very good and results obtained from 100 melts of 88 Cu, 9 Sn, 3 Zn bronze are given in Table IV of the article "Vacuum Treating Nonferrous Melts."

The scrap and ingots made from heats are remelted without the use of oxygen additions under an oxidizing atmosphere with no charcoal cover and without vacuum treatment. Physical properties and quality of castings from the remelts are equal to those obtained from the original heats. This experience is offered to support Mr. Colton's contention that the Naval Gun Factory melting practice must be reasonably good and that good melting practice can accomplish the same results as vacuum treatment, provided melt raw materials do not contain excessive amounts of gas.

Bronze ingots meeting chemical requirements have been purchased by the Naval Gun Factory for remelting. The castings made from these ingots very frequently failed to meet tensile test and soundness requirements. The failure to meet requirements was attributed to inability of the Naval Gun Factory melting practices to remove the gases contained in the ingots.

Although the above examples are not the conclusive evidence sought by Mr. Colton, they support the statement that Naval Gun Factory experience indicates the major source of gases in foundry melts is in the raw materials.

Magnitude of Improvement—It is true that in some cases the magnitude of the improvement in tensile properties of aluminum casting alloys by vacuum treating is small, as shown in Table I of the article. However, the tensile tests results of vacuum-treated aluminum alloys are consistently higher than those without vacuum treatment, and the soundness of castings produced from vacuum-treated melts is vastly superior to castings produced from melts without vacuum treatment. Fig. 5 of the article shows typical radiographs of this difference. The Naval Gun Factory vacuum treats all its aluminum alloy melts to obtain the increased casting soundness consistently obtained by this method.

As pointed out by Mr. Colton, in some cases of the bronzes described in Tables II, III and IV there is no tremendous improvement from vacuum degassing over normal good melting practices. In the majority of the cases, however, there is a tremendous improvement in both tensile properties and soundness of castings produced. This improvement makes the difference between accepting and rejecting castings both before costly machining operations and after.

The Naval Gun Factory has found it practical to degas these bronzes to produce consistently high-quality castings, to reduce rejections, to take care of variations in gas contents of raw materials for remelting and to improve the over-all quality of Naval Gun Factory scrap (heads, risers, gates, etc.) for remelting. We do not use vacuum treating on melts where it has been found to be unnecessary under its conditions. These melts consist of aluminum bronzes and bronze (88 Cu, 9 Sn, 3 Zn) scrap and ingots made in the Naval Gun Factory.

Porosity and Density Measurements—Per cent porosity and density measurements have been cited in several papers as an indication of gas contents of melts poured into standard molds. These papers include "Density of Light Alloy Castings" by M. W. Dougherty and L. W. Kempf, Aluminum Co. of America (AFS *Transactions*, 1945) and "The Removal of Gases from Molten Bronzes" by W. H. Baker and F. C. Childs (*Journal* of the Institute of Metals, August, 1944). The Naval Gun Factory has also found the density measurements very useful to compare the effect of gas content of metals on soundness of castings.

Gases for Shrinkage Distribution—The Naval Gun Factory prefers shrinkage control by known foundry molding methods over shrinkage distribution by small residual gas contents in the casting melts. This preference is based on three factors:

1. The difficulty of controlling the correct amount of small residual gas content of melts to furnish desired shrinkage distribution.
2. The need to produce high-quality castings without either distributed shrinkage or concentrated shrinkage.
3. The belief that lower rejection rates for castings are obtained with less effort and control by shrinkage elimination procedures than by shrinkage distribution procedures.

Gas Pickup from Molds—In considering Mr. Colton's thought that "the lower the gas content of the metal going into the mold the greater the tendency of the metal to pick up gas from the mold," other important factors (initial gas content of the melt and contact time between melt and mold) also should be considered as variables affecting the final gas content of the casting. When all three variables are considered, it is possible to agree with Mr. Colton's thought despite the fact that castings made from degassed Navy "G" bronze and other alloys at the Naval Gun Factory and poured into green sand molds contain very little gas porosity while those poured from gassed melts contain excessive gas porosity. Despite the likely greater rate of gas pick-up by degassed melts, the castings poured from degassed melts contain far less porosity than those poured from gassy metals.

Sand Molds and Inert Molds—Green sand castings, dry sand castings and forging ingots made at the Naval Gun Factory from degassed melts show great improvements in soundness and properties over the same products made with gassed melts. A combination of degassed melts plus inert molds would most likely give the greatest benefits to the foundry industry. The best combination for raw materials would be degassed melts made by foundry suppliers, poured into chill inert molds and sold to the foundry industry for remelting.

THE AVERAGE-JOB

QUALITY CONTROL SYSTEM

Average-job quality control is designed to provide a system which will keep scrap under control, and it currently is used in a number of foundries

By KENNETH M. SMITH
Foundry Consultant

AN ORDINARY daily scrap report of the type shown in Table I provides information of various possible uses. To illustrate, the data will be treated first by established foundry procedure and then by the average-job quality control system.

This table was submitted to a number of qualified foundrymen who represented the top management, supervisory, and technical functions of several foundries. They were asked these questions:

1. Which patterns would you select for attention?
2. What action would you take?
3. Aside from your interest in particular jobs, what is your reaction to the total scrap figure and the average figure?
4. After treatment of the identical data by the average-job system, two patterns were selected as affecting the total scrap figure in an abnormal way. The 6.1 per cent scrap figure was calculated to be out of control by 0.1 per cent, representing an excess of 22 scrap castings. This small amount was chosen purposely to create confusion in selecting the patterns responsible. Which two are they?

A summary of the replies gave the following conclusions. Established foundry procedure calls for action on the worst offenders—on a percentage basis—on the daily scrap report. Arbitrary limits are set up to separate the bad percentages from the good. One method calls for action on all jobs exceeding a certain figure, such as 10 per cent. Another method requires action on the six highest percentages. Common practice is to give special attention to these offenders through gating changes, new sand mixtures, specific pouring temperatures, increased supervision, etc.

In answer to question 3, only a few of the group expressed interest in the 5.5 per cent average from the standpoint of methods or process, and all felt that the total scrap would have to be much higher

TABLE I—Simple Scrap Report

Pattern Number	Pieces Made	Pieces Scrap	% Scrap
A	1782	136	7.6
B	130	15	11.5
C	2406	166	6.9
D	21	4	19.0
E	423	37	8.7
F	4690	305	6.5
G	1962	151	7.7
H	347	32	9.2
I	58	8	13.8
J	1475	105	7.1
K	43	7	16.3
L	4728	139	2.9
TOTAL	18065	1105	6.1
Yearly average to date			5.5

TABLE II—Scrap Report Plus Controls

Pattern Number	Pieces Made	Pieces Scrap	% Scrap	UCL %	Excess %	Excess Pcs.
A	1782	136	7.6	7.1	.5	9
B	130	15	11.5	11.5		
C	2406	166	6.9	6.9		
D	21	4	19.0	19.9		
E	423	37	8.7	8.7		
F	4690	305	6.5	6.5		
G	1962	151	7.7	7.0	.7	13
H	347	32	9.2	9.2		
I	58	8	13.8	14.5		
J	1475	105	7.1	7.3		
K	43	7	16.3	15.9		
L	4728	139	2.9	6.5		
TOTAL	18065	1105	6.118	6.0	.118	22
Yearly average to date			5.5			

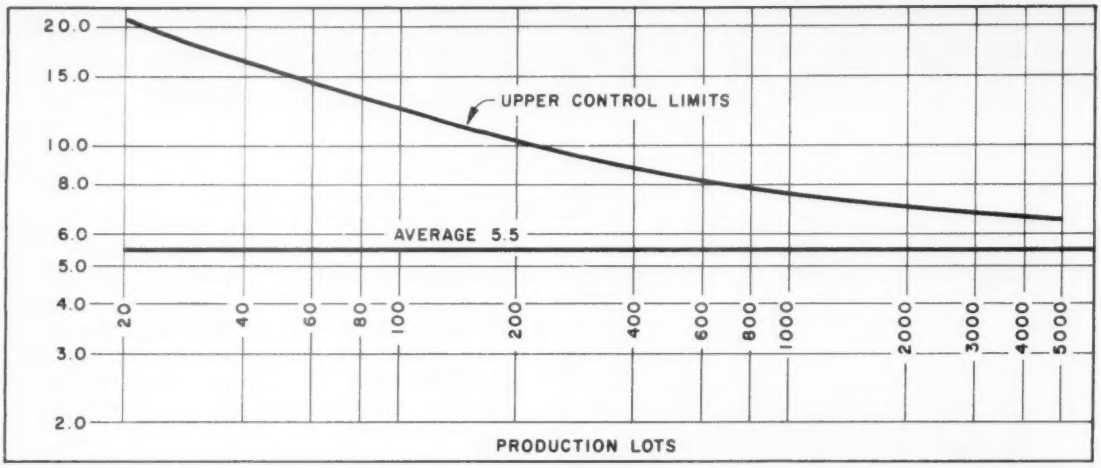


Fig. 1—Chart illustrates percentage of normal variation in defective castings allowed at a 5.5 average with production runs from 20 to 5000

than 6.1 before they would consider it abnormal.

In answer to question 4, two men named one of the two jobs correctly; no one named both.

To complete the comparison, the Table I data are repeated in Table II with statistical controls applied. Column five shows the limit of normal variation allowed the job at the production figure of each individual job. All of the upper control limits (UCL) are computed from the same average—5.5 per cent. Column six shows the two cases where the actual scrap exceeded the UCL.

For a clearer understanding of the amount of normal variation allowed at various production levels, see Fig. 1. It shows that for the same average figure of 5.5 per cent, it is normal for a production lot of 20 castings to have as high as 20.8 per cent defectives, while a lot of 5000 becomes abnormal when scrap exceeds 6.47 per cent.

A foundry usually establishes a quality control program primarily because it wants to reduce scrap. Such a program gains momentum when it attempts to control the amounts of salvage and machine shop or customer returns, and it reaches its maximum goal in the improvement of the good product. With emphasis on economy of operation, the average-job system is intended to cover all of the foregoing aims.

These are the basic requirements of the system: 1. A means to correlate result with action. 2. A means to correlate a job with process. 3. A means to measure process capability. 4. A means to pinpoint problems. 5. Ability to use the first four tools effectively. 6. Routine operation within each function and co-ordination of the whole through proper organization.

Four Functions—The average-job system breaks down the above requirements into four unlike functions which are developed and custom fitted into the particular organization as follows: 1. Collect pertinent data—clerical. 2. Pinpoint problems—statistical. 3. Investigate causes—technical. 4. Take action—supervisory.

It was decided that the average job would be the best agent to correlate result and action. Its performance provides a yardstick for comparing jobs and evaluating a process. It is sensitive to any abnormalities in the performance of man, material, equipment or process.

By definition, the average job in this system is the average performance of all jobs within a given type of work. Variation is measured by daily scrap percentages, and total scrap is broken down into percentages for each type of defect. The statistical chart shows the pattern number of every job that causes the average job to exceed the control limit.

Collecting the Data—Fig. 2 illustrates average job performance for the first and last months of a specific period. The average lines shown for September denote the best monthly performance to date in each casting defect. The total average of 3.8 per cent (it happens to be the figure for August, the best previous month) means that the average job of that period had 3.8 defective castings for each 100 made. The short average lines at the right of the chart give the September results —percentages for the individual defects and the 3.2 average for total production.

Pinpointing the Problems—Until recently, the main problem in controlling quality has been to isolate problems for further study; more time probably was spent in pinpointing difficulties than in solving them. Foundries which are receptive to statistical methods are able to eliminate this wasted effort.

In pinpointing problems we are concerned with two main types—those denoting lack of control and those involving process capability. Lack of control is evidenced through the individual jobs, as in Fig. 2, in those cases where the daily scrap percentage of all jobs exceeds the upper control limit (UCL). These abnormal percentages are encircled and the patterns responsible are identified. Such patterns are called out-of-control jobs, not because the job itself is out of control (it may not be) but becase it was responsible for the average job going out of control.

We must first assume that every job in produc-

tion is an average job, granting each the limit of normal variation scrapwise. The amount allowed is established by one probability formula and varies only according to the historical average of all jobs and the production figure of the particular job. As noted on Fig. 1, low production widens considerably the limits of normal variation.

The aim with respect to an out-of-control job is to determine what action can be taken to make it perform as the average job. It should be remembered that only a portion of scrap can be eliminated through perfect control; for the average job, control involves roughly 15 to 30 per cent of all defective castings. Most foundry scrap therefore arises through the limitations of our processes. This fact becomes more apparent when we consider that it is possible to have perfect control at an average scrap figure of 50 per cent, simply by varying above and below the 50 by a normal amount

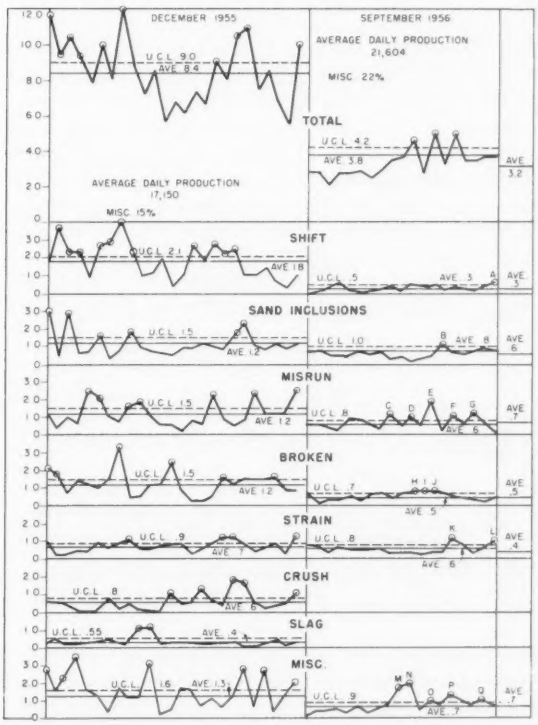


Fig. 2—Chart shows average-job performance for the first and last months of a ten-month period

determined by formula.

Little Room for Improvement—The problems of process improvement must be handled on the basis of affecting most or all jobs in the system. To illustrate the magnitude of a process problem, consider the averages of some of the casting defects in Fig. 2. If the average is 0.5 per cent and the control is good, the only way to lower the average is to improve a process that is already 99.5 per cent perfect—yet it must be done.

Each process improvement pays off on several or all jobs in the system. If we think of process in terms of avoiding types of defect, we are limiting our work to a handful of defects rather than to interest in hundreds or thousands of patterns. Usually six or fewer major defects account for 65 to 90 per cent of the scrap. We can take these six, one at a time, and work on improving process until we approach the point where further improvement would be economically impractical.

All investigations within the average-job system seek the cause for a known result. Statistical controls tell us when and where the result occurred, whether it involved an abnormal variation in an acceptable process or a normal variation in a questionable process, and, through the medium of the average-job performance, supplies us with a means to evaluate each result.

Good inspection is of primary importance to the investigation. We cannot expect 100 per cent accuracy in designating types of defects, but we should strive toward that figure. Defects handbooks help in proper identification, and investigation itself often helps to correct wrong diagnosis.

How To Proceed—Suppose that pattern X does not perform as the average job on a certain day. The defect is classified by inspection, and a review of the statistical history of the defect provides a second clue toward solving the cause. So far we are not sure if pattern X is an average job, just because it did not perform as one on a particular date. We still have these possibilities:

1. Pattern X is an average job but on this one date there was a temporary weakness in one of the foundry processes.

2. Pattern X is not an average job but can be made one through certain changes that will fit the job into existing processes.

3. Pattern X is not an average job, can never be one with existing processes but can be with special allowance in the use of process.

Investigation starts off by looking for a man, material, or equipment failure in the process. If the cause is not found after the first run and the job again shows lack of control with the same defect the next time the job is in production, the history is typical of the nonaverage job. Proof of this status is still in the future, but investigation should consider the possibility that case 2 or case 3 is involved. When the job has been properly classified there are often several solutions possible to cure the problem.

Process improvement requires first that we know its capability. For tools we need some technical ability, a willingness to explore the unknown, devotion to the cause and a keen sense of relationship between cause and result. In the past there has been a tendency to seek full correlation between cause and result rather than a partial relationship in some instances. For instance, many agree that the primary cause of sand inclusion defects is careless molding and that it does not originate from the surfaces of the mold cavity or the gating system. We have been able to correlate castings defective because of sand inclusions with the number of dirty molds on about a 20 per cent basis; that is, one sand inclusion defects results from each five dirty molds. In squeezer shops a low per-

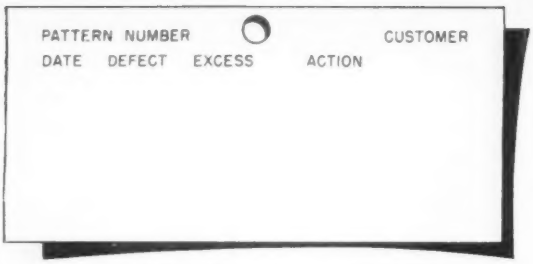


Fig. 3—Card 3x5 in. includes data on the number of excess defective castings on a particular job

centage of dirty molds is five out of a hundred but that means 1 per cent scrap.

It is not uncommon to find up to 20 per cent of all molds produced are dirty and the sand inclusion defect is 3 to 4 per cent. Routine checks by a foreman not only reveal the extent of the problem but can result in a worthwhile reduction in scrap.

Another major defect in the squeezer shop is shifts, and it is not difficult to correlate shifted castings with particular flask or jacket alignment. Usually a program of careful checking of equipment before each production run eliminates the bulk of the scrap from this source.

Correlation is not the only consideration. How do we know when to improve a process or change to a better one? One way is to ascertain if other foundries are using an improved or superior process. A better answer is never to be satisfied with an existing process if it is economically sound to improve it.

Lack of Consistency?—It is a common claim that cast products offer less guarantee of consistent quality than those fabricated by other methods. Our only means of refuting this claim is through control — which helps but is limited by process capability — and primarily through process improvement.

A good guide is to establish control first and then improve process, measured in terms of ability to avoid casting defects, until all major defects average less than 0.5 per cent and all minor defects are at a much lower figure. Regarding the needle-in-a-haystack aspect of trying to improve a process when only one out of 200 castings is adversely affected by it, take some consolation in the fact that usually there is more than one way to do it.

For example, some of the reduction of the defect averages in Fig. 2 came as a result of improvements in control and process capability which were based on the over-all picture of the average job. As the work progressed, however, it became apparent that because this was an air furnace malleable operation, many of the defect averages were being influenced by the performance within a period of ¾-hour—the heat period. When careful analysis showed that 30 to 40 per cent of the total scrap could be avoided through perfect performance during the heat, separate charts were set up to measure heat performance. Closer control was established over this phase, and a few more improved processes began to help lower the average lines of the various castings defects involved.

Some defects are caused only during shakeout and cleaning. Charts which evaluate performance in these areas are of great benefit to supervisors responsible for cracked and broken castings.

The Right Kind of Data—Too often we report information that has less than no value, for we can be misled by it. If a scrap report shows production figures from one day's heat and some of the defective casting figures belong to the heat of a different day, the average-job system is thrown completely off base.

When the scrap report is not accurate, the usual cause is a cleaning room bottleneck. Under these conditions a vital communicating link between cause and result is lost. When cleaning and finishing cannot keep up with production, it still is possible to keep alive the communication system, provided that we either rough inspect the castings at an early stage or establish some means for identifying or separating the castings from each heat. There should be no problem, of course, when castings produced on one day can be completely cleaned and inspected on the following day.

Collecting pertinent data is, to a large extent, a matter of breaking down information until the anticipated problem becomes exposed. Process work involving the broken castings defect necessitates investigation into the various sources of the breakage. The data must indicate the size of the problem at each source. In the section on investigation, some of the work called for data covering pouring, shakeout and cleaning operations

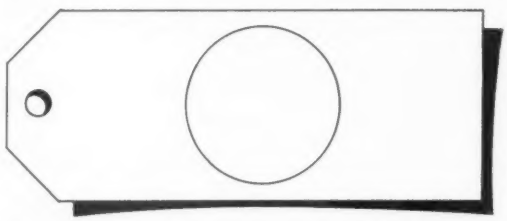


Fig. 4—When other action is impossible because run is over, tag pattern with red-circled card

which involved portions of several defect percentages. The origin of other defects centers attention on the period of time before the patterns go into production and, of course, the molding period itself.

When the data pertinent to the above time periods is drawn up, it often contains an element of surprise as to the source of some of our major problems. The important thing is that we can depend on proper data to direct investigation toward the source of each problem that we are able to evaluate on a statistical basis.

Taking Action—This step is the payoff function of quality control. It isn't paying off too well in some foundries because the foundation is insecure. Without proper data and careful investigation, consistently effective action is not possible. Statistical controls add so much more to the foundation that action gradually becomes routine. Of the four functions, only action is strictly a line pro-

position. Possibly for this reason it takes longer to acquire the routine effect because foundry supervision has been somewhat slow to accept a change of method in handling quality problems.

To help avoid any hesitancy to take action when lack of control is pinpointed, the following procedure is established. First, the job or jobs involved are listed on the control chart, with a red circle around the point out of control in the particular casting defect. A 3 x 5-in. card (Fig. 3) is made out which includes information on the number of defective castings in excess of that allowed for the average job. In each case the maximum variation is granted for each production figure before computing the excess.

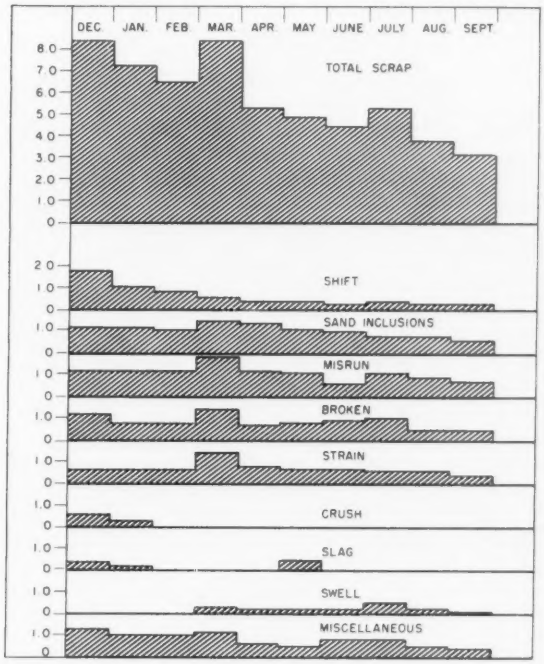


Fig. 5—Monthly bar chart for management shows progress, trends and other data on scrap control

When castings are produced on the first day and cleaned on the second, the red-circle cards are handed to the foreman by 9 a.m. on the third day. He then is allowed time to investigate before deciding what corrective action he deems necessary. At the start of the system it is much more important to take some action than to take the correct action. The recorded history of that action serves to guide us toward correct action when first attempts fail.

In rebuttal to this last statement, the jobbing shop often replies, "We don't get a second chance. Our jobs run only once." There may be such shops, but checking shows that over 50 per cent of their scrap consists of repeaters. The 3 x 5 card has sufficient space to record action for ten or more occasions; after that a second card may be stapled on.

The only time when no action on a job is warranted is when the production run is finished and possible action is not known because investigation could not be made. In this case the action on the card should read "Pattern tagged." The tag shows only a large red circle (Fig. 4) because the job, before going into production again, must be called to the attention of the foreman, at which time he must refer to the red-circle card for the past history to find out which defect he must investigate during the new run.

Action to improve process is not ordinarily considered the responsibility of a foreman, although a few of them have exhibited some aptitude in this direction. Consider the possible bad effects from an ill-conceived process change. For example, some shops are in difficulties for several months because of a misuse of molding sand additives. Improving process not only requires the highest type of investigation, but also, in many instances, the best technical ability available. No change whatsoever should be made in foundry practice unless the proposed change is designed to alter the known results indicated on the control charts.

Because of the far-reaching effects of a process change, both the foundry superintendent and the technical engineer should participate in the work. This arrangement will speed action and give greater assurance that the detailed instructions of a process change will be carried out as directed by the foreman.

Often the desire for action originates at the top management level. For this reason management is supplied with a monthly bar chart (Fig. 5) which shows the progress, trends and further opportunities for improvement in each type of casting defect.

Organization and Integration—This subject is too important to be treated adequately here. For the viewpoint of the author, refer to FOUNDRY, October, 1952, and July, 1955. Briefly, the modern approach is to consider quality control, in the overall sense, as a staff function responsible to top management. The step to take action is largely handled as a line function by the foundry superintendent. Clerical and statistical functions remain staff, and investigation is usually a combination of both.

It is important to appoint an operating head of quality control, preferably a technical man, and to create a package arrangement of the four functions based on a carefully spelled out degree of cooperation between line and staff, with safeguards to insure the effective use of all four functions. Applications are somewhat flexible to suit a particular organizational setup, but principles are considered to be rigid.

Conclusion—The 18 foundries now controlling quality through the average-job quality control system have two things in common. Each has experienced noteworthy low scrap periods from time to time in its past history, only to lose these gains for no apparent reason. They now find that although it requires a major effort to establish new procedures for lowering scrap percentages, it is a fairly simple matter to hold their gains and to make further progress. **—The End**

CO_2 CORES and SHELL MOLDS
... A Modern Production Team

Two of the industry's newest production methods are combined in an efficient setup for making small-size nonferrous castings in quantities on a jobbing basis. Automatic machines are a feature

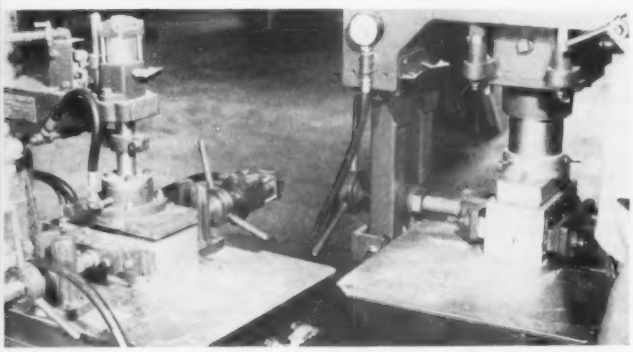
By ROBERT H. HERRMANN
Associate Editor

SHELL molds and CO_2 cores team up for production of close-tolerance, smooth-surface aluminum and copper alloy and manganese bronze castings at City Pattern Foundry & Machine Co., Detroit. Cored castings average about 1¼ lb. Uncored castings weighing up to 22 lb have been produced.

Four machines—a shuttle dump box shell molding unit, a coreblower, a gassing machine for hardening cores and a pressure-pin closing machine—form a neat production quadrangle in which two men, working as a team, can make and set off a cored mold in about a minute.

The shell machine, having a dump box at one side, oven at the other and shell removal station in the center, is completely automatic through one shell-making cycle. Cope and drag are made as a single shell on one plate and the shell is broken in the center to obtain the two mold halves. Maximum size of each half is 15 x 20 in. A hood over the machine exhausts fumes and heat.

When the operator removes a shell from the machine he pushes a button to start another shell-making cycle. He places the completed cope on the bottom pins of the closing machine and sets the CO_2 cores. Loose sand particles are blown off the cope with an air hose, and the arm of the closing machine, containing the mold half, is swung under a perforated tray of powdered resin. An air vibrator attached to the tray deposits resin on the parting surface of the cope.



Blown corebox is gassed in automatic machine at left while another box is being blown at right

The drag is placed on the cope and the assembly swung under the top pins of the closing machine and raised into place by an air cylinder. Residual heat in the shells melts the powdered resin to bond the cope and drag together. The completed mold then is set out in a wheeled rack for movement to the pouring floor where it is poured horizontally.

In the meantime the other man removes a blown corebox from the blower and inserts an empty box in place and hits the blow lever. The blown box is placed in the automatic gassing machine. The push of a button energizes an air cylinder to clamp the box in position. A second cylinder lowers the gassing head to the box. A rubber grommet around the head forms a gas-tight seal against the box.

Gassing requires only a few seconds depending on size of the cores, and is time cycled. Approximately 10 lb of core sand can be blown. When the core is hardened, the gassing head is raised, the box clamp released so that the box may be removed and the cores taken out for placement on a storage plate beside the closing machine. If coreboxes are suitable, cores can be stripped mechanically by an air cylinder in the bottom of the machine.

Carbon dioxide is supplied to the gassing head at 20 psi by two cylinders piped in series. With this arrangement, gas flow from each cylinder is reduced to one-half, and the likelihood of freeze-up in the pipes is minimized. Coreboxes have vents in the bottom and two sides to permit escape of air and gas during the blowing and gassing operations.

Core sand is prepared in a standard mix-muller and contains 4 per cent sodium silicate plus a nominal amount of kerosene to slow down hardening time sufficiently to prevent excessive sand clogging in the blowholes of the coremaking machine. Occasionally, during a day's operation, the blowhead is removed from the machine and sand is cleaned from the holes with hot water.

Mixed sand is delivered to and kept in the hopper of the coreblowing machine in a plastic bag encased in a protective burlap sack. The open end of the bag is placed over the hopper opening which feeds the machine. **—The End**

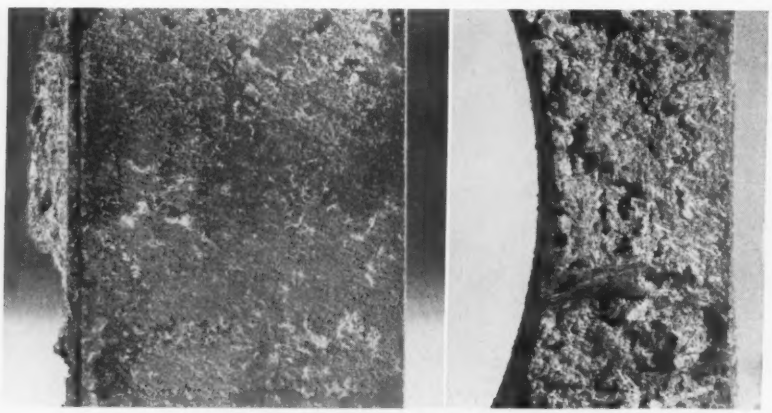
Operator removes hardened core from box on table of automatic gassing machine. The pressure-pin machine for closing shell molds is in background

Questions and Answers

Metal may be poured too soon after zinc and lead additions . . . No easy answers to elimination of sand problems . . . Coreshooter ejects sand by pressure of fixed volume of air . . . Condition of subsoil important in construction of a molding pit . . . Bushings in permanent molds cause trouble

Zinc Additions Cause Trouble

QUESTION We are forwarding a section from a 25-lb casting which shows crevices and pits on the cope side. The trouble results only when zinc is added to the alloy of 71 per cent Cu, 5 per cent Sn, 20 per cent Pb, and 4 per cent Zn. We pour the castings from a 600-lb ladle. In transferring the metal from the furnace to the ladle we add 4 lb lead and 12 lb zinc. Green sand molds are used, and pouring temperature is 2080° F.



Views of casting specimen illustrating surface and fracture appearances

How can we avoid the crevices and pits or zinc oxide condition on the cope surface? Is there anything we might add to the molten metal to counteract the agitation caused by addition of the zinc?

ANSWER Presumably the lead and zinc additions to the ladle are intended to replace the amounts lost by volatilization during melting, but we wonder why the additions are made in the ladle rather than in the furnace. If you actually have poured castings without making additions in the ladle, and have found them free from the bad surface condition you mention, it is obvious where the trouble lies. Hence, unless you have to meet a tight specification on composition, it would be wise to eliminate the additions in the ladle.

On the other hand, if requirements are such that the additions must be made, then the place for them is in the furnace about 5 minutes before transferring to the ladle.

We suspect that the trouble is due to the fact that the metal is poured too soon after the addition, and you confirm that by the mention of agitation. Addition of cold and possibly damp material to molten metal usually causes considerable agitation, and the cold zinc seems to generate considerable fume when first introduced. Possibly, if temperature conditions permit, the trouble might be overcome by holding the metal in the ladle for at least five minutes after the addition, or until the agitation ceases.

The fractured face of the specimen submitted shows a somewhat mottled structure with some dendritic areas. This condition may result from gassy metal or lack of feed, and we are inclined to the idea of gassiness caused by the metal being poured in an agitated or turbulent state.

Wants Good Sand for Aluminum

QUESTION Some time ago we ran across an article describing some of the practices in a light metal foundry for production of castings of thin section with close dimensional tolerances. Do you know what type of sand was used? If not, can you supply any information on synthetic sands for aluminum castings? We would like to keep to a minimum blowholes, porosity and other defects due to sand condition. Is there any type of sand or a sand mix with low moisture content that could be used to obtain top-grade aluminum sand castings?

ANSWER We do not have any information on the sand used by the foundry you probably refer to except that at one time a natural sand was being employed, and presumably that is still in use. One would suspect from reference to smooth surface obtained that a fine grain sand is employed—and in the case of large castings, a fine sand is used for facing backed up with a coarser sand to permit ready escape of gases. Some molds undoubtedly are skin dried since mention is made of carbon coating on the molds. We believe the practice is to provide the carbon coating by smoking with an acetylene torch adjusted to provide a smoky flame.

As for your own practice, you will have to do some investigational work, and to carry on such work it will be advisable to obtain testing equipment to determine sand properties such as grain fineness, permeability, compression strength, moisture content, etc. Once the standards are established, the instruments are used for control.

You undoubtedly are aware that surface smoothness of castings is related closely to fineness of the sand used. Also, the finer the sand, the lower its permeability or ease of penetration by gases. Hence, the choice of sand is a compromise on those characteristics—that is, the sand is fine enough to give the best surface appearance without causing blows due to lack of permeability. With light castings the sand naturally can be finer than with heavy castings since light sections, through more rapid solidification, generate less gas. Where possible it is advisable, to use as coarse a sand as surface appearance will permit to avoid possibility of blows due to low permeability. From the foregoing, one would expect that a wide range of sands is used by aluminum alloy founders, and that is evident from the following: In naturally bonded sands the grain fineness will range from 140 to 260; green compression

strength from 6 to 8 psi; permeability from 5 to 15; clay content from 15 to 22 per cent, and moisture content from 6 to 7 per cent. In synthetic type sands the grain size may vary from 70 to 160; green compression strength from 6 to 10 psi; permeability from 25 to 120; clay or binder content from 4 to 10 per cent, and moisture from 3 to 5 per cent.

Impels Sand into Corebox

QUESTION Recently we noticed a reference to core shooting machines and would like to know what they are, and the principle on which they operate.

ANSWER The term, core shooting machine, is a literal translation of the compound German word, "kernschiessmaschine," in which the central portion, "schiess," means to shoot. The German for core blower is "kernblasmaschine."

The operative principle, if it may be called that, is impulsion whereby the sand is ejected from the machine by the pressure of a fixed volume of air. Essentially the operation is accomplished by use of an air reservoir of suitable capacity attached to the sand magazine of the machine with a relatively large, quick opening valve between the two.

With the valve between the two chambers closed, the magazine is filled with sand and the reservoir filled with compressed air at line pressure. The air line valve is closed and the sand magazine sealed from the hopper through an interconnected valving mechanism. Then through a similar arrangement the blow valve beneath the sand magazine and the valve between the magazine and the air reservoir are opened simultaneously. That impels or ejects the sand in a mass through the large single blow hole at the bottom of the magazine.

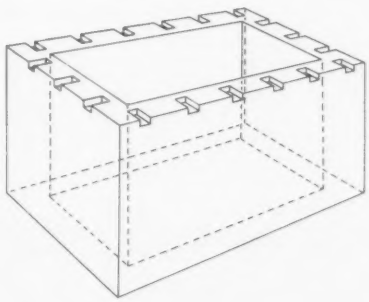
Constructs a Pit for Molding

QUESTION We are going into the production of larger gray iron castings and will require molding equipment 12 ft wide and 25 ft long. It will be necessary to employ pit molding, but since we have had no experience in the construction of a pit, we will appreciate some information.

ANSWER One of the first things to determine in constructing a molding pit is whether or not the subsoil at the depth to which you expect to go is reasonably dry. If water is present to any degree, probably a membranous seal will have to be placed under the bottom and up the sides above the water level before laying the concrete. The pit must remain dry at all times.

If water conditions are bad, the underlying soil may have to be tiled and drained to a sump equipped with pumps. Use of waterproofing compounds in the concrete helps to keep out moisture.

Another consideration is the load-bearing capacity of the soil. The following maximum loads per square foot usually are used for calculation:



Sketch shows general features of pit

Soft clay, 1 ton; fine-grained wet sand, 2 tons; dry fine-grained sand or hard clay, 3 to 4 tons; coarse gravel without mica or clay, 6 tons; shale, 8 to 10 tons. To determine the highest possible load per square foot on the pit floor, multiply the weight of a cubic foot of cast iron by the depth of the pit in feet. For example, in a pit 10 ft deep the maximum load on the floor slab would be 10 x 450 or 4500 lb per sq ft. If the soil yields or compresses under loading, piles will have to be driven to bedrock or firm soil for proper support of the floor slab.

While you speak of molding equipment 12 x 25 ft, it is not clear if that is the desired dimension of the pit opening. Also no mention is made on possible depth. In designing a suitable pit it is necessary to have dimensions of the pattern so that the sand can be packed conveniently and effectively around it. Probably the best idea would be to take the largest casting you expect to make as the base. Determine its depth below the parting line, and add a sufficient distance for a suitable sand bed. The added figure will depend on the type of castings; one foundry, for example, making large castings in pits uses a foundation of 16 in. of sand rammed firmly into place. That is followed by a layer of small coke 8 in. thick connected to vent pipes. The coke is covered with straw or heavy paper and then the actual sand bed on which the pattern rests is rammed in to a thickness of 6 in.

Dimensions of the pit opening will depend on the contour of the casting. Where the conformation permits all of the sand to be rammed vertically, less space will be required around the pattern than where curved surfaces, undercuts, etc., require horizontal ramming. In the first instance 2 or 3 ft will suffice. In the latter case 5 to 6 ft will be necessary because working in cramped quarters is fatiguing and does not permit good craftsmanship.

In a pit of the size you have in mind the floor slab and walls should be 18 in. thick, suitably reinforced with steel rods laid in two directions. The standard 1-2-4 concrete mix should serve. Top of the pit should be at floor level, and when not in use for a period of time it can be filled with the molding sand to form a level surface and eliminate a large pile of sand. Heavy eye-bolts should be imbedded about every 3 ft in top of the wall to permit tieing down and securing the cope. Tops of the eye-bolts are just below the surface of the walls, in suitable depressions so as to eliminate obstructions.

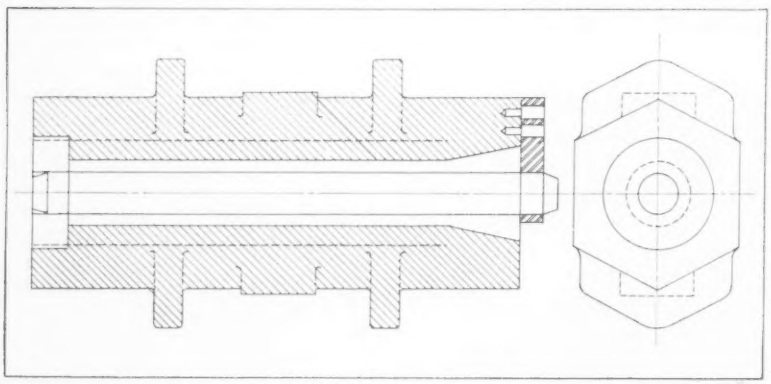
Bushings in Permanent Molds

QUESTION We have been making tin bronze bushings in permanent molds in our foundry in India for the past year but have considerable difficulty with defective castings. Bushings are made in two sizes, 22 and 28 mm ID with 41 and 46 mm OD, respectively, and are 10 to 12 in. long with feeder. Used for bearings, the bushings must machine up internally without the slightest flaw. Alloy contains 8 per cent min Sn, 6 to 8 per cent Pb, 2 per cent max Zn, 0.75 per cent min. Ni, 0.05 per cent max P, 0.5 per cent max impurities, and remainder Cu. Charges are composed of 25 per cent ingot, 50 per cent scrap including runners, and 25 per cent borings are melted in a reverberatory, oil-fired furnace

in 200-lb lots under a slag composed of 10 lb borax and 5 lb manganese dioxide.

Metal is deoxidized with 1 lb phosphor-copper (16 per cent) for each 100 lb metal. Temperature is not measured but judged to be about 1250° C. Metal is tapped in lots of about 70 lb to pour six to seven bushings. Oil-sand cores are machine extruded and made of silica sand with 0.5 per cent linseed oil, 1 per cent core gum and 0.5 per cent bentonite; baked at 400-450° C in a vertical continuous oven. Larger (28 mm diam) cores are coated with a paint containing 4 per cent aluminum powder and 2 per cent dextrine and dried with a torch after painting. Cores are weak and crumble in handling. If core strength is increased with extra oil or even cereal, they blow.

Molds initially are dried with an oil burner and remain hot the rest of the day. Molds are sprayed with a coating of 1 lb plumbago, 2 oz silicone, 1 gallon kerosene. Castings are poured directly through the mold top. Castings rejection run up to 30 per cent due to core blows, dross-like inclusions and porous spots, pinhole porosity or coarse dendrites. We tried iron rods wrapped with asbestos paper as cores without success as the paper peels off on cooling or, if intact, tears while pouring the metal and appears as inclusions in the castings. Paper is moistened with 2 per cent dextrine water before wrapping on rod and sealed with a paste containing 5 per cent aluminum powder, 2 per cent dextrine, remainder water. The cores are dried at least 15 minutes at 570° F.



Cross-sectional view of permanent mold used for making small bushings

ANSWER Study of your inquiry indicates that you undoubtedly are having troubles from more than one source although possibly the core problem may cause the major amount of rejects. With reference to the sand cores we note that you mention baking at 400 to 450° C, but believe that you mean degrees F since the cores would be burned up at the indicated temperature. While you state that the cores are weak and are hard to handle, it is difficult to say definitely whether the mixture or baking is at fault. We suggest you investigate the baking time at the 400 to 450° F range and determine if the cores are being overbaked. Also it would be advisable to check the oven temperature and determine whether the operating range is correct.

We suspect that the method of making the cores and handling them to the oven requires some green strength, otherwise we would suggest trying core sand mixed with 1 per cent oil. Presumably the bentonite addition is to give green strength, but we doubt if the addition of 0.5 per cent accomplishes much. Possibly a core mix containing 1 per cent each of core oil and bentonite or cereal without the core gum—which we assume is a resin—will produce a satisfactory core. It will be well to experiment with core mixtures to develop one which will not be weak and crumble since there is no doubt that they cause much of your trouble. Another is the method of pouring of which more will be said later. A possibility for cores would be use of the CO_2 process.

It is preferable to use the iron rod covered with asbestos paper rather than the sand cores, but, as you indicate, sufficient rods must be available to take care of the desired production. However, you would not need the same number of rods as castings produced each day. If the castings are placed in a tank of water as soon as they are removed from the molds, the asbestos will be softened quickly for removal of the rods. Undoubtedly a simple punch or press could be rigged up to speed the removal. Then the rods could be recoated, dried and used.

It appears that application of the asbestos paper to the rods is not being done properly. Probably the paper is not sufficiently moistened with the adhesive material; the paper absorbs the water, leaving practically a dry adhesive on the surface. Perhaps you wait too long between moistening and applying the paper to the rods, permitting the adhesive partially to air dry.

Tearing of the asbestos paper from the rod during pouring is caused by the metal stream impinging on it. The same cutting or washing action occurs when sand cores are used. In either case you will have to use a pouring basin or tundish to insure that the molten metal drops midway between core and mold wall. Naturally the mold will have to be located so that it is as near to vertical as possible. The pouring basin preferably is made of graphite. Only two holes will be required in the basins. Depth of the holes through the material should be at least 1 in. For the smaller bushing the holes should be 9/64 in. in diam, and for the larger, 3/16-in. Hole size should be maintained constant for best results.

Possibly you also may be picking up some gas during melting. The borings should be free from oil, which can be a source of gassing of the metal. If much oil is present, the borings should be centrifuged, which additionally permits recovery of the greater portion of the oil. The borings then are heated on a pan or in a rotary furnace at a temperature just sufficient to drive off the remaining oil.

You state that you are melting under an oxidizing slag composed of two parts by weight of borax and one part manganese dioxide. Presumably the materials are mixed and placed on the charge. We believe from some earlier work by Baker and Child that it would be better to use the manganese dioxide alone, placing it on the bottom beneath the charge—about 2 per cent by weight. Your addition of 1 lb phosphor copper (16 per cent) per 100 lb for deoxidation is considerably higher than usually is recommended. The Tin Research Institute suggests 0.05 to 0.10 per cent P, or 10 to 20 oz per 200-lb charge, while Baker and Child recommend 0.03 to 0.05 per cent P, or 6 to 10 oz phosphor copper (16 per cent) to the 200-lb charge.

Your pouring temperature (1250° C) seems high and we suggest trying 1175 to 1180° C. The purchase of a pyrometer will be well worth the investment since it eliminates guessing whether the metal is too hot or too cold. Definite melting and pouring ranges should be used.

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Mechanical Goods Division

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Men of Industry

● WILLIAM E. MAHIN
. . . Malleable Research head

● OSCAR E. SUNDSTEDT
. . . General Foundry pres.

● SAMUEL M. BICKLEY
. . . v. p., General Foundry

● S. G. FALK
. . . heads Castings Branch

WILLIAM E. MAHIN was elected president of the recently organized Malleable Research and Development Foundation. A graduate of the University of Notre Dame, Mr. Mahin did metallurgical work with Inland Steel Co., Vanadium Corp. of America and Westinghouse Electric Corp. from 1927 to 1946, when he joined Armour Research Foundation, Chicago. In 1949 he became director of research at Armour and in 1953, technical director, Vanadium Corp. of America. Recently he was vice president-director of research, Hunter Engineering Co., Riverside, Calif., and a management consultant specializing in research and development.

Edward C. Phelps was named works manager of Cooper-Bessemer's Mt. Vernon, O., plant, succeeding **Peter R. Letz,** who will direct an expansion program at the company's plants in Mt. Vernon and Grove City, Pa. **Harold C. Johnson** was appointed manager of manufacturing to administer production facilities of both plants. **C. W. Gilchrist,** formerly foundry superintendent for the company, was made assistant works manager.

Glenn H. Crocker, chief application engineer of centrifugal equipment, Roots-Connersville Blower Division, Dresser Industries, Connersville, Ind., was appointed manager of factory sales. **Joseph L. Hylton,** assistant to the sales manager, was named manager of market research.

● **Oscar E. Sundstedt** was named president-general manager, and **Samuel M. Bickley,** vice president-assistant general manager, General Foundry & Mfg. Co., Flint, Mich. **Carl W. Bonbright,** former president, retired recently. Vice president-general manager since 1947, Mr. Sundstedt has been with General Foundry for 26 years. Mr. Bickley joined the company in 1955 as a process engineer.

W. H. Wendel, vice president, Carborundum Co., and general manager, Coated Abrasives Division, was elected group vice president to co-ordinate activities of the Coated Abrasives, Curtis Machine, Globar and Stupakoff Divisions. Recent appointments in the Coated Abrasives Division include: **John F. Claydon,** general manager; **Herbert P. Dales,** sales manager; **J. G. Khoury,** assistant sales manager; **A. R. Perry,** Detroit field sales manager; **K. H. Wisby,** Southwestern field sales manager.

J. W. Butler was appointed assistant director of the Joint Iron Council, Council of Iron Producers, and the Council of Ironfoundry Associations, London. **D. L. Farrant** has succeeded Mr. Butler as secretary of the three councils.

Warren C. Corbin was appointed salaried personnel director, Central Foundry Division, General Motors Corp., Saginaw, Mich. **Robert J. Gleffe** was named personnel director of the Saginaw Malleable Iron plant, there.

● **S. G. Falk** has been appointed chief of the Castings Branch, Iron and Steel Division, Business and Defense Services Administration, Washington. He is succeeding **Clyde B. Jenni,** chief metallurgist, General Steel Castings Co., Eddystone, Pa. Mr. Falk is on loan from his position as manager of marketing research, Falk Corp., Milwaukee, to which he was appointed 6 months ago after being manager of steel casting and weldment sales for the company. He can be reached at Commerce Department, Room 4222, Sterling 3-9200, Extension 2279.

Dr. Arthur G. Metcalfe, since 1955 senior metallurgist, was appointed supervisor of physical metallurgy, Armour Research Foundation, Illinois Institute of Technology, Chicago. **Donald H. Turner,** formerly associated with the foundation, and since 1954 research engineer, Titanium Metals Corp. of America, Henderson, Nev., was named supervisor of melting and heat treating services at Armour.

Michael Sandor was appointed technical manager of the metal processing department recently established by Nopco Chemical Co., Harrison, N. J., to develop and sell processing compounds, including shell mold lubricants.

Emmett H. Mann was appointed vice president-general manager, Leschen Wire Rope Division, H. K. Porter Co., St. Louis. Until recent-

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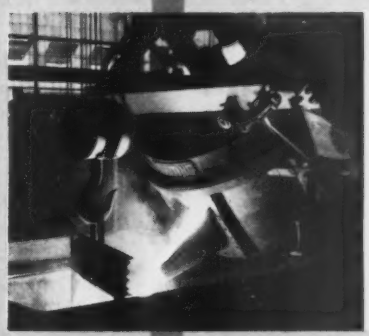

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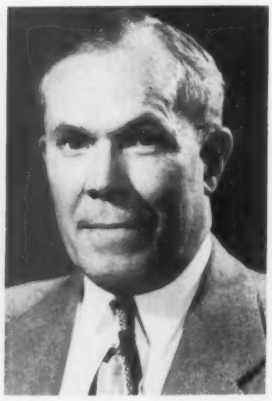
Circle 633 on Inquiry Card—Page 225

● FRANK X. BUJOLD
. . . foundry division mgr.



● RAY H. SULLIVAN
. . . Ford group v. p.

● A. W. SOKOLOWSKI
. . . becomes engineering v.p.

● WILLIAM HAGEL
. . . operations v. p.

ly he held a similar post with the company's Alloy Metal Wire Division which he joined 7 years ago as a sales engineer, and was made general manager in 1956.

● **Ray H. Sullivan** was named group vice president, Ford Motor Co., Dearborn, Mich., as a result of recent organizational expansion of the basic manufacturing divisions. Mr. Sullivan, with Ford since 1948, for the past year was vice president and group executive in charge of metal stamping, engine and foundry, parts and equipment manufacturing divisions. **C. H. Patterson,** formerly general manager of the engine and foundry division, was named group executive, engine and foundry. He joined the company in 1927 and later was production manager of manufacturing operations and foundry at the Rouge Motor plant. **Frank X. Bujold,** since 1952 manager of foundries, engine and foundry division, becomes general manager of the foundry division. He joined Ford in 1949 as controller at the Dearborn iron foundry, jobbing foundry and pattern shop after similar work at Saginaw Malleable Iron Division, GMC, Saginaw, Mich., and Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich.

● **Harold C. Erskine,** for the past year general manager, castings division, Aluminum Co. of America, Pittsburgh, has been named assistant general production manager. Duties of **John L. Patterson,** since 1954 general manager of the fabricating division, have been expanded to include managership of the castings division works operations. Mr. Erskine was previously manager of the company's Fairfield, Conn., and Cleveland operations, and assistant manager of the die casting division. Mr. Patterson was formerly manager of the Buffalo fabricating operation, and works manager at New Kensington, Pa.

● **A. W. Sokolowski** was named vice president-engineering, the Lanly Co., Cleveland. He will continue as chief engineer, a position he has held since 1946. Mr. Sokolowski joined the company in 1939 following graduation from Purdue University.

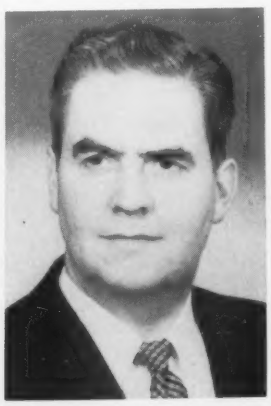
● **William Hagel,** formerly vice president and executive assistant, United Engineering & Foundry Co., Pittsburgh, was appointed vice president-operations in charge of manufacturing facilities and production. He will continue to supervise the estimating and sales contract departments. He joined the company in 1917.

E. D. Mooney was appointed consultant to the foundry services department, Benj. Harris & Co., Chicago Hgts., Ill.

● **Clinton Westin** was appointed assistant general manager, Superior Steel & Malleable Castings Co., Benton Harbor, Mich. **Jay Rakstis** replaces Mr. Westin as chief metallurgist. Mr. Westin has headed the metallurgical department since 1943, and the inspection department since

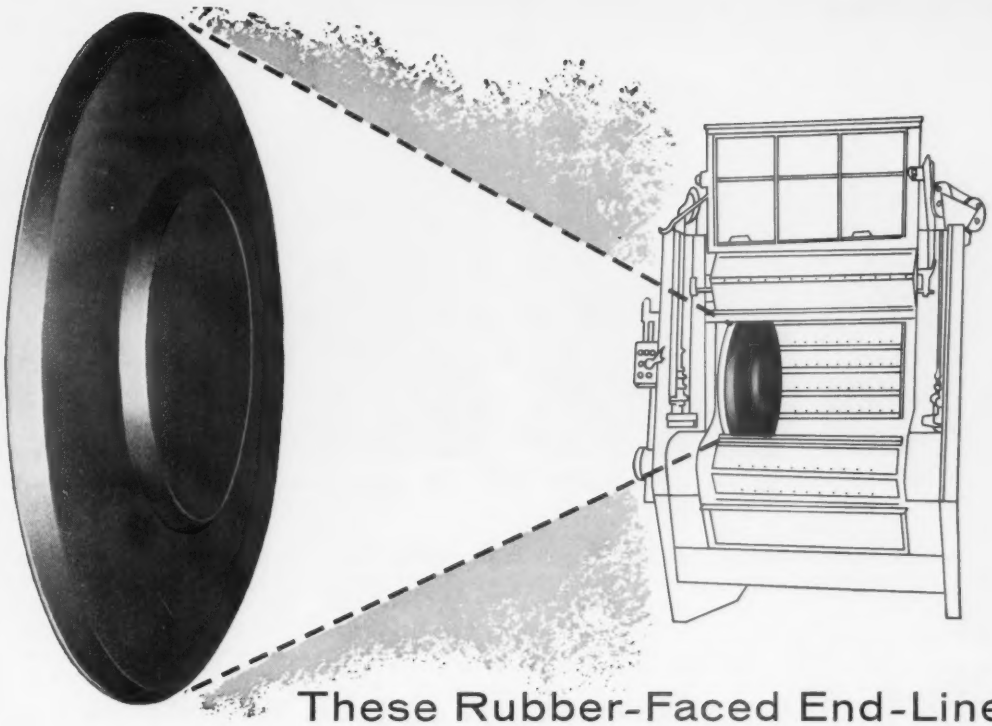
● HAROLD C. ERSKINE
. . . assistant production mgr.

● JOHN L. PATTERSON
. . . mgr. of Alcoa divisions



● CLINTON WESTIN
. . . asisstant gen. mgr.

● JAY RAKSTIS
. . . chief metallurgist



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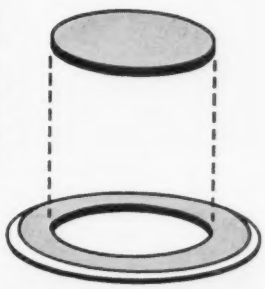

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Gates

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● HAROLD F. HANSSEN
. . . Howard Foundry plant mgr.

● C. E. PRETZINGER
. . . Pacific Coast mgr

● JAMES W. EARLY
. . . McCormick Co. pres.

● ALEXANDER C. ANDREW
. . . AFS chapter chairman

1945. Mr. Rakstis joined Superior Steel in 1950 and was chief chemist since 1953.

● **Harold F. Hanssen** has been appointed plant manager of the Los Angeles Electric Alloy Steel Division, Howard Foundry Co., Chicago. With the company 15 years, he managed another of Howard's investment casting foundries in Milwaukee, and prior to that headed the company's Chicago pattern and die manufacturing plant.

● **Herman Bohr Jr.**, chairman of the Tennessee Chapter of the AFS, since 1946 has been a partner in Robbins & Bohr, manufacturers' agents, Chattanooga. A graduate of University of Chattanooga, for 8 years he was associated with Republic Steel Corp., in the operating and sales department.

● **C. E. Pretzinger** has been appointed Pacific Coast manager, Pangborn Corp., Hagerstown, Md., succeeding **Ralph M. Trent**, who recently became executive vice president of the company. Mr. Pretzinger joined Pangborn in 1949 and was formerly assistant to Mr. Trent.

● **James W. Early** was elected president, J. S. McCormick Co., Pittsburgh. Other changes in personnel include: **Day E. Cutler,** executive vice president; **R. Wayne Bickerton,** secretary-treasurer; **William N. Seese,** sales manager; **Francis J. Bernarding** and **James O'H. Denny,** special representatives with headquarters in Pittsburgh; **Jack A. Arelt,** Philadelphia, and **John H. Voigt,** Buffalo, sales and service representatives.

Charles P. Luckie was appointed district manager, Federated Metals Division, American Smelting & Refining Co., New York. With headquarters in Minneapolis he will head sales and services in Minnesota, North and South Dakota.

● **Roy O. Schiebel,** since 1955 sales manager, was made second vice president-sales and marketing, Magnaflux Corp., Chicago. During 17 years with the company he served as field engineer, Los Angeles branch manager, Midwest district manager, and Eastern district and export manager in New York.

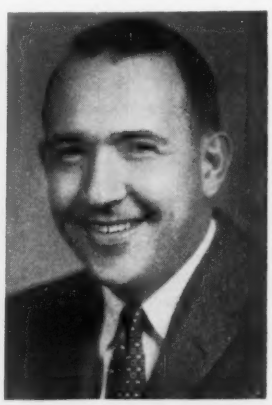
● **Alexander C. Andrew,** chairman of the Eastern New York Chapter of the AFS, is foundry superintendent, Adirondack Foundries & Steel Inc., Watervliet, N. Y., which he joined in 1955. For 25 years he was associated with American Locomotive Co., Schenectady, N. Y., where he spent 10 years as foreman. After a year each with Greenwich Mfg. Co., Greenwich, N. Y., and Ramsey Chain Co., Albany, N. Y., he joined Adirondack Foundries in 1955. Mr. Andrew was one of the founders of the Eastern New York Chapter and its first chairman in 1948-49.

● **Warren W. Brown** was appointed manager of sales and marketing, and **Norman Petitte,** assistant sales manager, Superior Foundry Inc., Cleveland. Mr. Brown was previously vice

● HERMAN BOHR JR.
. . . heads Tennessee Chapter

● ROY O. SCHIEBEL
. . . sales and marketing

● NORMAN PETTITE
. . . assistant sales mgr.



● WARREN W. BROWN
. . . sales-marketing mgr.

WHAT FOUNDRY MEN ARE SAYING

"Not one blow has been experienced with CO_2 hardened cores

Cured a 5500 lb. mold in 40 minutes

Cures our cores perfectly in 20 seconds

Reduced our core room space by 2/3

Far fewer gaggers needed in molds

No danger of drops, soft spots or wet spots in molds

Eliminates 60% of our core handling

Molds may be left for several weeks without pouring

Over-all costs of making cores have been reduced by more than 50%"

FOR CORES
Liquid Carbonic CO_2 core curing set-up in operation at Pacific Brass Foundry, San Francisco, California.

FOR MOLDS
Fast, bakeless hardening of molds for large castings—like this one for 3400 pound nickel aluminum bronze propellers—is standard procedure at Columbian Bronze Corporation, Brooklyn, New York.

About the amazing CO_2 process for curing cores and molds

Learn why foundry men the world over are so enthusiastic over amazingly fast bakeless core and mold curing. CO_2 curing is as easy as it is inexpensive. Liquid Carbonic's free folder gives complete instructions. Or, if you prefer, a trained "Liquid" representative will call on you and conduct a demonstration. Just mail the coupon.

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● CARL F. ISONHART
. . . Michigan sales, Thiem Co.

● J. E. BOWEN
. . . AFS chapter chairman

● WILLIAM J. MARTIN
. . . joins Michigan Abrasive

● ROBERT G. HALL
. . . joins Pangborn Corp.

president, Carondelet Foundry Co., St. Louis, and Mr. Petitte was a sales engineer with Superior Foundry.

● **Carl F. Isonhart** recently joined the Michigan sales staff, Thiem Products Inc., Milwaukee, to serve in development of new products and service engineering. He attended University of Detroit and was formerly in new product development work with Frederic B. Stevens Inc., Detroit.

● **Robert W. Richardson** and **Norman S. Barnes** were named assistant sales managers, Spencer Turbine Co., Hartford, Conn. With the company since 1940, Mr. Richardson covered the Connecticut territory as a sales engineer for several years. Mr. Barnes has been with the sales department since 1948.

● **J. E. Bowen,** chairman of the Saginaw Valley Chapter of the AFS for the current year, since 1948 has been superintendent of melting, Chevrolet-Saginaw Gray Iron Foundry, GMC, Saginaw, Mich. He attended Wabash College and joined the department in 1929 after spending two years in an Indianapolis laboratory.

● **William J. Martin** recently joined Michigan Abrasive Co., Detroit, as district manager in the Cleveland-Columbus-Pittsburgh area. Mr. Martin spent 16 years as a district representative for Peninsular Grinding Wheel Sales Corp., Detroit, and recently was sales manager of Smith Facing & Supply Co., Cleveland.

● **W. A. Hunter** recently joined Beardsley & Piper Division, Pettibone Mulliken Corp., Chicago, as project and development engineer. For the last 7 years he was foundry equipment engineer, Dominion Engineering Works Ltd., Montreal,

William T. Gallagher recently joined the technical service and sales department, Pennsylvania Foundry Supply & Sand Co., Philadelphia. With headquarters in Plainfield, N. J., he will cover the New York metropolitan area.

● **Robert G. Hall** was appointed blast descaling representative, Pangborn Corp., with headquarters at the main office in Hagerstown, Md. Mr. Hall will work on all industrial descaling applications as well as special steel mill equipment for mill roll blasting, ingot mold cleaning, and other steel mill processes. He was associated with Minnesota Mining & Mfg. Co., St. Paul, for the last 20 years.

Eugene J. Sullivan, formerly general manager of the resins and chemicals and polyco-monomer departments, was named vice president-sales, Chemical Division, Borden Co., New York. He joined the company 10 years ago.

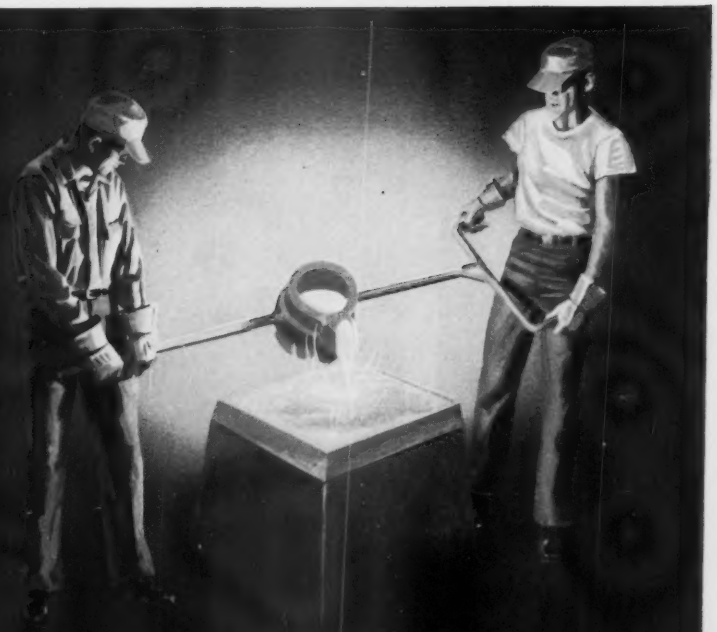
● **Walter E. Foreman,** since 1949 Cleveland district field engineer, Norton Co., Worcester, Mass., was appointed southeastern Ohio abrasive

● ROBERT W. RICHARDSON
. . . assistant sales mgr.

● NORMAN S. BARNES
. . . assistant sales mgr.

● W. A. HUNTER
. . . joins Beardsley & Piper

● WALTER E. FOREMAN
. . . Norton sales, Columbus



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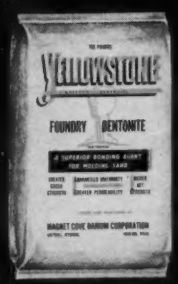
BENTONITE

for the best casting results

When you really want the best casting results Yellowstone Bentonite is your answer. Complete uniformity is guaranteed because Yellowstone is 100% pure Wyoming bentonite. Due to selective mining, there is a stockpile of 200,000 tons of the finest colloidal bentonite and this bentonite is processed in the world's most modern bentonite plant at Greybull, Wyoming.



Test after test proves Yellowstone Bentonite to have greater green strength and higher permeability. Because of this great strength and superior bonding characteristics, only small amounts of Yellowstone Bentonite and water are needed to temper.

Ask your distributor for Yellowstone Western Foundry Bentonite.

TYPICAL CHEMICAL ANALYSIS OF YELLOWSTONE WESTERN BENTONITE:

	%		%
Moisture	6.64	CaO	0.64
Combined Water	5.90	MgO	1.53
SiO_2	59.92	Na_2O	2.06
Al_2O_3	19.78	K_2O	0.57
Fe_2O_3	2.96	pH in water suspension	9.2

MAGNET COVE BARIUM CORPORATION

ONE OF THE DRESSER INDUSTRIES

HOUSTON, TEXAS

● CLIFFORD E. WENNINGER
. . . joins Beardsley & Piper

● L. H. BROGLEY
. . . Quad City chairman

● WILLIAM D. SIGNER JR.
. . . joins Acheson Colloids

● S. C. LAWSON
. . . joins Wellman Bronze

engineer for the company, with headquarters in Columbus. He joined the company in 1945 as a sales engineer.

● **Clifford E. Wenninger** was appointed technical director, Beardsley & Piper Division, Pettibone Mulliken Corp., Chicago. For the past year he was technical director, Hydro-Blast Corp., Franklin Park, Ill. Previously he was associated with National Engineering Co., Chicago, and the University of Kentucky.

● **Robert T. Haigh** and **Bruno D. Hendrickson** have been assigned to the western New York territory, Norton Co., Worcester, Mass., with headquarters in Rochester and Buffalo respectively. **Charles R. Garfield** will handle accounts in Pittsburgh and northwest Pennsylvania, and **David L. Lloyd-Rees** in Pittsburgh and southwest Pennsylvania. Mr. Hendrickson has been a Norton abrasive engineer since 1954. The others have been promoted from field engineers to abrasive engineers.

● **L. H. Brogley,** chairman of the Quad City Chapter of the AFS, for 11 years has been foundry metallurgist at International Harvester Co.'s Farmall Works, Rock Island, Ill. He joined the company 28 years ago and served as chemist and metallographer. Mr. Brogley was Quad City Chapter's vice chairman last year.

● **William D. Signer Jr.,** formerly with Commercial Controls Co., Chicago, was appointed service engineer in the Rochester, N. Y., office, Acheson Colloids Co., New York, to serve western and central New York state and Erie County, Pa. Mr. Signer studied at Rochester Institute of Technology and later at University of Rochester.

R. J. Kelly and **E. F. Helminiak** were appointed sales engineers, Electro Metallurgical Co., division of Union Carbide & Carbon Corp., New York. Mr. Kelly has been assigned to the district office in Phillipsburg, N. J., and Mr. Helminiak to the Chicago district office.

● **S. C. Lawson** was appointed Midwest representative, Wellman Bronze & Aluminum Co., Cleveland, with headquarters in Milwaukee. His territory will include the Chicago, Wisconsin and Minnesota areas. A graduate of University of Wisconsin, Mr. Lawson was associated with Ampco Metal Inc., Milwaukee, from 1938 to 1955, when he became a manufacturers' representative.

R. E. Dunfield recently joined Syntron Co., Homer City, Pa., and has been assigned to Syntron Connecticut Sales Co. **W. L. Jolly,** added to the company's Houston Sales Co.'s sales staff, will cover the area outside metropolitan Houston. **F. G. Flesche Jr.** will handle vibratory material handling sales on the Syntron Newark staff.

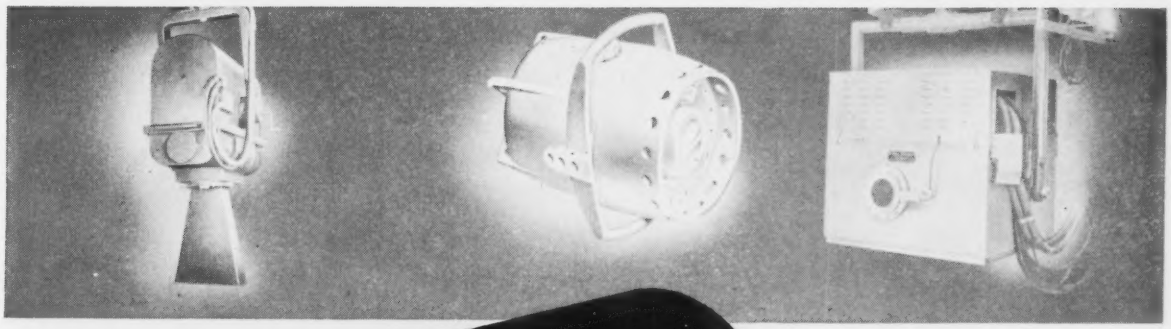
● **Richard H. Brookes,** chairman of the Central Indiana Chapter of the AFS, since 1951 has been foundry superintendent, Ewart Plant, Link-Belt Co., Indianapolis. He joined the plant's routing department in 1924,

● CHARLES R. GARFIELD
. . . N.W. Pa. sales, Norton

● DAVID L. LLOYD-REES
. . . S.W. Pa. sales, Norton

● ROBERT T. HAIGH
. . . Norton sales, Rochester

● RICHARD H. BROOKES
. . . heads AFS chapter



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Kodak Industrial X-ray Film, Type AA

Read what the new Kodak Industrial X-ray Film, Type AA, will do for you.

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- Gives greater subject contrast, more detail and easier readability when established exposure times are used with reduced kilovoltage.
- Shortens processing cycle with existing exposure technics.
- Reduces the possibility of pressure desensitization under shop conditions of use.

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X-ray Division
Rochester 4, N. Y.

Kodak

Now, RCI offers a cold setting core binder

New FOUNDREZ 7200 eliminates many production headaches, even with the largest cores!

RCI, working with foundry experts at the company's Swiss affiliate, has now developed a cold setting organic core binder, known as OL-COROVIT. You can order it as FOUNDREZ 7200.

FOUNDREZ 7200 solidifies in the core box at room temperature. This means you can handle even the largest cores routinely. In addition, an easily controlled accelerator gives short setting times, and lets you regulate setting time to your production requirements. FOUNDREZ 7200 not only makes green strength unimportant, but also eliminates core distortion during baking.

Baking time required for cores bonded with FOUNDREZ 7200 runs half or less than half that required when you use conventional binders.

Physical Properties of FOUNDREZ 7200

FOUNDREZ 7200 consists of:

1. A specially modified drying oil with these properties:

Average Viscosity	Z_2-Z_4
Non-Volatile	100%
Lbs./Gal.	7.85
Color	Dark

2. FOUNDREZ 7200-A accelerator

This new RCI core binder can be stored indefinitely in closed, well-filled containers. Also important to production, FOUNDREZ 7200 binder is *absolutely non-toxic*. It causes no reaction on the skin, even after long contact.

Extra Advantages with FOUNDREZ 7200

1. **Air-drying of sand** is all that's needed when you use FOUNDREZ 7200 core binder.
2. **Excellent flow properties** of FOUNDREZ 7200 sand mixes mean you can cut down sharply on the amount of ramming when you fill a core box.
3. **Fewer core arbors and rods** are needed when you use FOUNDREZ 7200 binder.
4. **No bedding sand or dryers** are required during baking of cores.
5. **Almost no gas or smoke** is emitted on pouring.
6. **Easy shake-out** is achieved every time, because FOUNDREZ 7200 burns away readily.
7. **Less time and labor** are needed. You cut the work involved in making large cores to about 20% of that required with conventional core mixes when you use the new FOUNDREZ 7200.

Write for full information. If you would like to know the procedure and typical formulations for better core binding with RCI's new FOUNDREZ 7200, write today for *Technical Bulletin F-11*.

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Sodium Sulfite • Pentaerythritol • Pentachlorophenol • Sulfuric Acid

REICHHOLD CHEMICALS, INC., RCI BUILDING, WHITE PLAINS, N. Y.

Circle 638 on Inquiry Card—Page 225

● JOHN J. DURNAN
. . . Behr-Manning sales

● HIRAM BROWN
. . . becomes technical advisor

● DELBERT G. LUPER
. . . AFS chapter chairman

● L. C. DANIELS
. . . becomes general mgr.

later transferring to production where he set up a foundry training program. He became assistant foundry superintendent in 1945.

● **John J. Durnan** was named eastern regional product engineer, Behr-Manning Co., Troy, N. Y., division of Norton Co., Worcester, Mass., succeeding **Elmo Oathout,** retired. Mr. Durnan joined Behr-Manning 14 years ago and until recently was a product engineer for the company, with headquarters in Troy.

● **Hiram Brown,** formerly chief metallurgist, Solar Aircraft Co., Des Moines, Iowa, has been appointed technical advisor to the plant manager. Mr. Brown was graduated from Fenn College and subsequently was foundry metallurgist, Aluminum Co. of America, Pittsburgh, metallurgist, Frontier Bronze Corp., Niagara Falls, N. Y., and assistant works manager, Aluminum Industries Inc., Cincinnati.

Ned I. Malcolm has joined Hyster Co., Portland, Oreg., as sales promotion representative with headquarters at the Danville, Ill., plant, where he will co-ordinate promotional programs in the company's eastern Industrial Truck Division.

H. H. Brandt was appointed New York district sales representative, Laclede-Christy Division, H. K. Porter Co., St. Louis. Previous connections include National Carbon Co., New York, and Bethlehem Steel Corp., Bethlehem, Pa.

Clyde Pence was named director of research and product development, Asbury Graphite Mills Inc., Asbury, N. J. He joined the company in 1942 and was formerly quality control chemist and plant manager.

● **Delbert G. Luper,** president of the Mexico City Chapter of the AFS, since 1947 has been technical engineer, Iturbe y Zalce S.R.L., Mexico City, Mex. While working as a patternmaker for National Brass Works Inc., Los Angeles, he attended night classes at University of Southern California, later becoming night foundry foreman for the company. Later he was associated with Grayson Controls Division, Lynwood, Calif., Repcal Brass Mfg. Co., Los Angeles, and Maritime Brass & Bronze Works, Harbor City, Calif.

ROY F. NOSEK, appointed sales manager, Beardsley & Piper Division, Pettibone Mulliken Corp., Chicago, as reported in February issue

P. M. Wheeler, assistant sales manager, Indiana Steel Products Co., Valparaiso, Ind., was promoted to sales manager. He joined the company in 1951 as sales engineer.

James E. Burke, formerly vice president, Wisconsin Gray Iron Foundry Co., Milwaukee, recently joined the sales department, General Metals Corp., Los Angeles.

● **L. C. Daniels** was named general manager of Allis-Chalmers' Buda Division Tractor Group, Milwaukee, and **Owen J. Higgins** is new general manager of the division's Harvey, Ill., works, where material handling equipment is manufactured. **R. K. Mangan,** former president-general manager of the Buda Division, retired recently. Mr. Daniels joined Buda Co. as vice president in 1950, and when it was acquired by Allis-Chalmers in 1953, continued in charge of material handling products. Mr. Higgins has been assistant general works manager of the Tractor Group since 1950.

George E. Tate, since 1950 treasurer, Federal Foundry Supply Co., Cleveland, has been made a member of the company's board of directors. He joined the company in 1926.

Arthur Rowe, chairman of the Connecticut Chapter of the AFS since 1953 has been made foundry manager, Producto Machine Co., Bridgeport, Conn. For 4 years he was associated with his father in the Rowe Foundry Co., Florence, Mass., and after graduating from University of Massachusetts in 1949, became foundry engineer, American Hardware Co., New Britain, Conn. In 1950 he joined Gorham Mfg. Co., Providence, R. I., as assistant foundry superintendent, and in 1951 became foundry superintendent at Producto Machine Co.

Arthur Herbener recently joined Electro Metallurgical Co., division of Union Carbide & Carbon Corp., New York, as Pittsburgh district sales representative. Previously he was with Vanadium Corp. of America, New York; Bethlehem Steel Co., Bethlehem, Pa.; General Electric Co., Schenectady, N. Y.; and Aluminum Co. of America, Pittsburgh.

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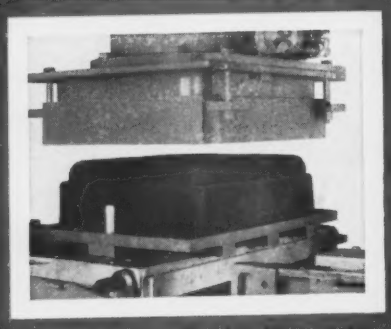
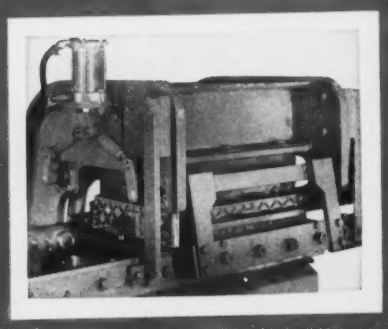
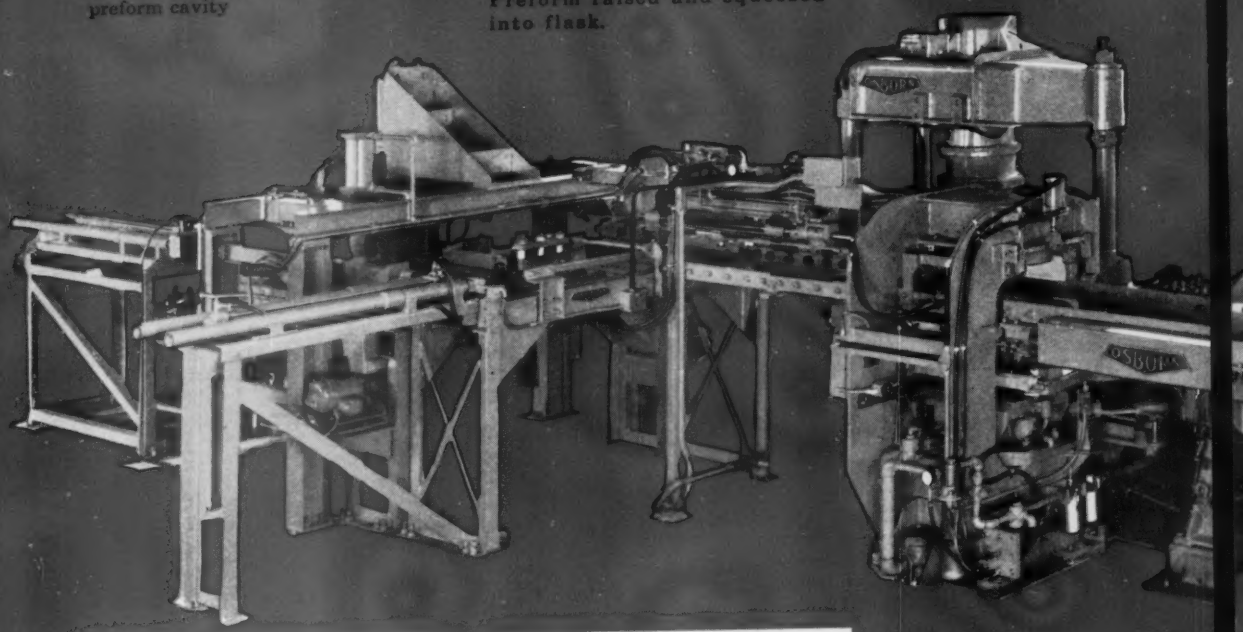
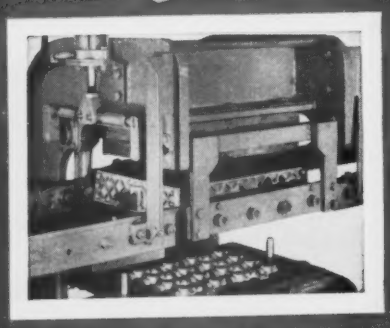


Blow Station — Sand is blown into preform cavity

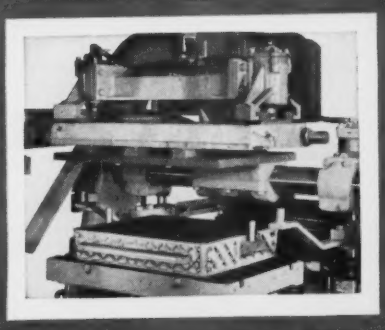


Flask raise and squeeze station — Preform raised and squeezed into flask.





Cope Strip — Roller bars engage flask rails for accurate stripping.



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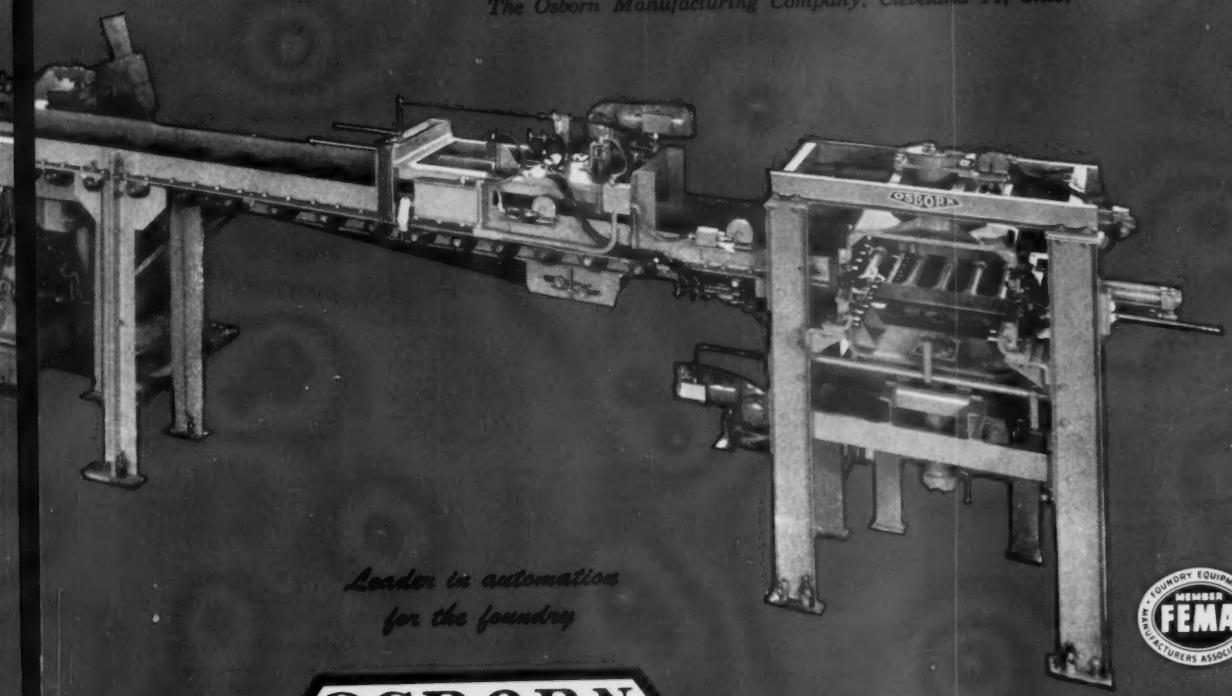
Short-run and mass-production foundries alike benefit from Mol-dex... Osborn's completely integrated, fully automatic foundry production system.

Osborn's Mol-Dex production unit, combined with shakeout and flask return and close machines, and with automatic transfer conveyors, assures a continuous flow of quality castings on a pre-set time cycle. Quick pattern changes between cycles are permitted by the floating platen.

For complete details on these and other developments by Osborn, the leading producer of foundry production machinery, write *The Osborn Manufacturing Company, Cleveland 14, Ohio.*



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FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION INC. MEMBER FEMA

Circle 639 on Inquiry Card—Page 225

Some of the program committee members and speakers. Left to right: Paul Green, General Electric Co. Erie Foundries; Walter Albrecht, Chain Belt Co.; Ernest J. Stockum, Dayton Malleable Iron Co.; Robert Cech, National Malleable & Steel Castings Co.; L. C. Marshall, Link-Belt Co.; Joe Beckham, Texas Foundries Inc.; Henry Felten, Peoria Malleable Castings Co.; James Lansing, MFS technical and research director

Conference Discusses Variety of

MALLEABLE OPERATING PRACTICES

AN attendance of 150 at the second annual Technical and Operating Conference of the Malleable Founders' Society marked the largest gathering in history for any of the society's meetings. It was held at the Wade Park Manor, Cleveland, Feb. 7-8.

The program committee chairman, Ernest J. Stockum, Dayton Malleable Iron Co., Dayton, Ohio, presided. He pointed to the desirability of raising the quality of the industry's product as a whole, an endeavor in which conferences for the exchange of technical information can play an important part.

The opening session, devoted to malleable melting, had H. C. Stone, Belle City Malleable Iron Co., Racine, Wis., as technical chairman.

In discussing **Direct Air Furnace Melting,** Russell Sawyer, Frazer & Jones Co. Division, Eastern Malleable Iron Co., Syracuse, N. Y., described that company's operating practice with a 36-ton unit.

This furnace has a silica sand bottom and 15¾-in. wall thickness. It is repaired each Saturday, and side walls are rebricked every two weeks. Eight to ten heats are obtained per bung. Importance of placing the charge in the furnace so as to avoid gouging the bottom was stressed. Steel and other scrap are charged first, topped by pig iron. A flat flame impingement helps to reduce erosion at the metal line.

Melting requires 24 minutes per ton on the first heat, 22 minutes for subsequent heats. The furnace is pulverized-coal-fired and consumes 855 lb per ton of metal melted.

Air Furnace Oil Firing in Duplex Melting by Milton Tilley, National Malleable & Steel Castings Co., Cleveland, pointed out the advantage of this type of fuel over coal in being able to burn twice as much carbon out of the metal. For this reason National installed oil burners on each side of the pulverized coal burners. The oil is used only when metal received from the cupola has excessive carbon.

Mr. Tilley recommended 1) use of the heaviest oil that can be handled without creating excessive sludge, 2) keeping the supply line from the storage tank warm in cold weather, 3) cleaning out sludge weekly or oftener, 4) avoidance of flame or raw oil impingement on brickwork.

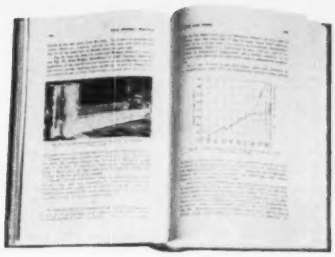
Discussing **Hot Blast Use,** Carl F. Joseph, Central Foundry Division, General Motors Corp., Saginaw, Mich., expressed surprise that more foundries have not taken advantage of the opportunities this melting practice offers to save money and improve metal quality. He cited the case of one gray iron foundry melting 25,000 tons of metal annually which saved $78,000 a year on an equipment investment of $55,000.

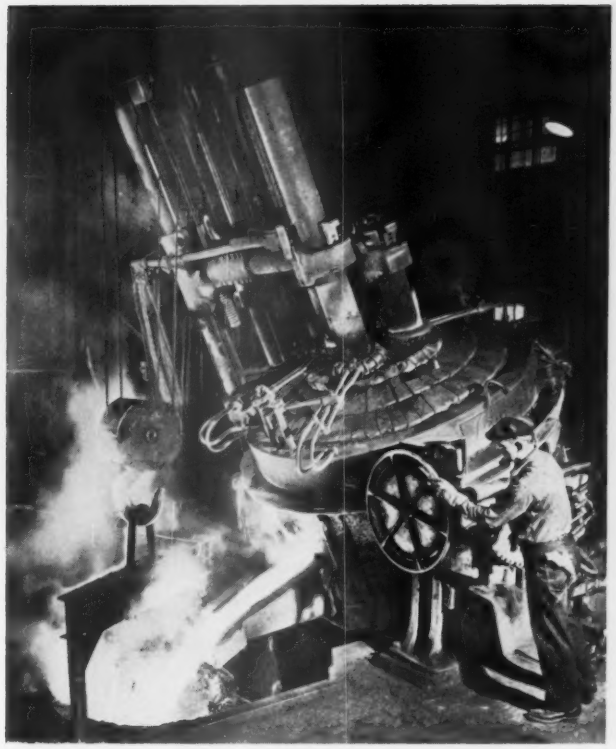
Mr. Joseph described the equipment which uses waste gases as a heat source and the externally fired type of unit; he then listed actual operating data to show savings effected in coke use—averaging about 15 per cent—and in consumption of

Presenting

STEEL FOUNDRY PRACTICE

By JOHN HOWE HALL





496 pages
252 charts and illustrations
6″ x 9″ cloth bound
Price $12.00

Steel Foundry Practice by John Howe Hall is a comprehensive sourcebook covering all phases of modern steel foundry practice. The only up-to-date treatment of the subjeet available today, it contains practical information on the production problems encountered by foundrymen producing castings in any type of metal.

This book is an invaluable source of data for foundry personnel, educational institutions, technical libraries and suppliers to the foundry industry. A complete cross index provides easy reference to material in any section, and bibliographies at the ends of chapters point out additional sources of information.

Mr. Hall was associated with the production of castings for nearly 50 years as an employee of various producers and as a consulting metallurgist. He was the author of *The Steel Foundry,* which was published in 1914, with a second edition in 1922, and wrote many technical papers. In 1924, Mr. Hall received the first Whiting Medal awarded by the AFS.

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6. Centrifugal Casting
7. Shakeout, Cleaning and Welding
8. Heat Treatment
9. Cast-Weld Construction
10. Open-Hearth Steelmaking
11. Electric Melting Furnaces
12. Converter Process
13. Pouring Practice

alloys. In addition to the reduction in oxidation and in sulphur content of the metal, hot blast is credited with reduced bridging in the cupola, more uniform chemistry, higher melting rate, hotter iron, and fewer defective castings.

Dehumidification as applied to the cupola blast was described by Fred W. Jacobs, Texas Foundries Inc., Lufkin, Tex. Three years ago this company installed a $24,000 refrigerant type unit which removes moisture in excess of 3 grains per cubic foot of air. The drier air reduces coke consumption by 11 per cent, giving an annual saving of about $11,000. Saving per ton of metal is 51.6 cents. Operating cost is 6 cents per ton.

Other advantages credited to dehumidification include reduced oxidation, hotter metal, curtailed freezing at the tuyeres and, in general, better operational control of the cupolas.

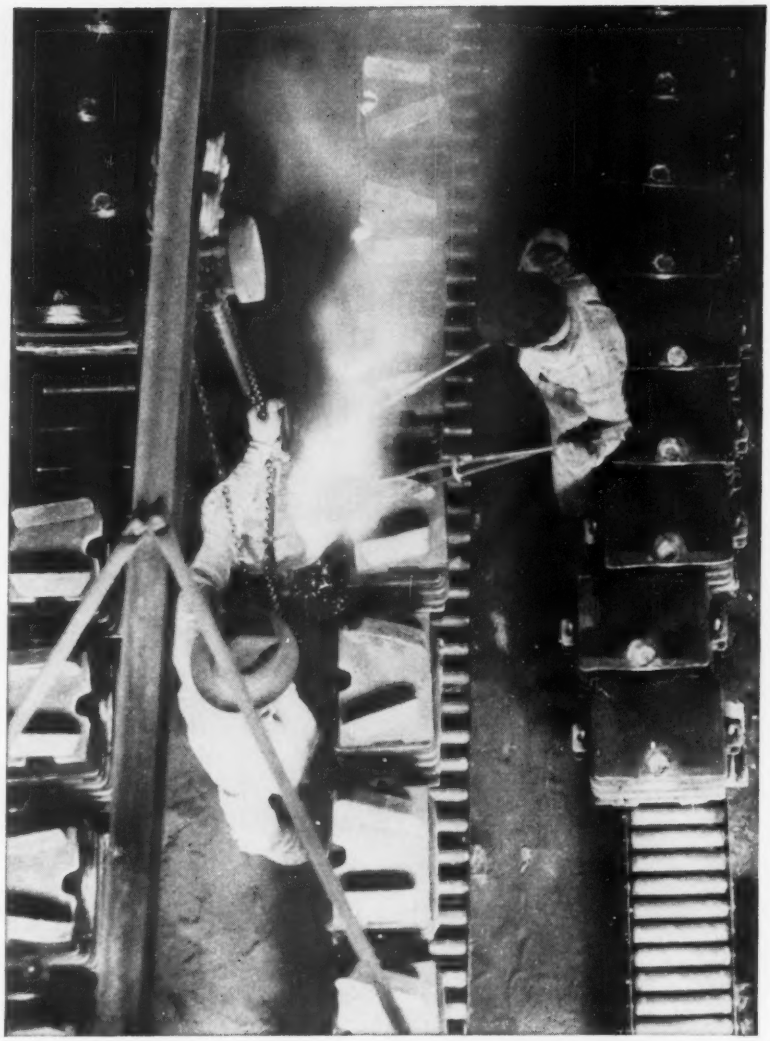
Water-Cooled Cupola Operation, according to R. H. Greenlee, Auto Specialties Mfg. Co., St. Joseph, Mich., offers these advantages: 1. Longer operation of the cupola with less refractory failure. 2. Increased melting rate through use of a thinner lining (8-9 in.) at the melting zone. 3. Saving on cost of refractories and maintenance labor. 4. More uniform metal analysis and fewer hot spots. 5. Improved working conditions.

The speaker recommended use of external cooling rather than internal glands. Glands, he pointed out, reduce the melting zone area and are rather difficult to replace. Auto Specialties' installation consists simply of a ring of 2-in.-diam pipe located 7 ft above the tuyeres. Water flows from the pipe through ¼-in. holes spaced 1 in. apart, travels down the outside of the shell, and then is collected for sluicing off slag.

Afternoon session was devoted to coremaking processes and a discussion of the society's core research project. With Ernest J. Stockum, Dayton Malleable Iron Co., presiding, Hans Jacob, Lehigh Inc., Lehigh, Pa., spoke on **Further Developments in Use of the CO_2 Process for Cores.**

He stated that his foundry's standard procedure now is based on a sand mixture containing seacoal, silicate, and raw sugar syrup. This mixture is prepared by adding 1 per cent seacoal by weight to the cool dry sand in the muller and mixing for one minute. Then 1 per cent raw sugar syrup is added and mixed for another minute. Finally 3 per cent sodium silicate is added and mixed for three minutes.

Some saving in CO_2 consumption and more rapid curing or hardening of cores result from use of heat ex-



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changers to raise the temperature of the CO_2 to about 300°F. Over-gassing must be avoided since it results in friable cores. Mr. Jacobs indicated that the CO_2 process reduced core-making costs 21 per cent compared with previous conventional practice.

C. O. Williamson, Grinnell Corp., Columbia, Pa., said that after considerable experimenting the CO_2 process for cores gave good results with 2½ to 6-in. pipe fittings but was too costly for smaller sizes. Advantages cited were better finish, closer dimensional tolerances which resulted in reduced casting weight, and increased rate of production. Sand used is a blend of 75 per cent sand with an 80 AFS grain fineness number and 25 per cent of 45 grain sand. Blended sand is mixed with 4 per cent proprietary silicate binder and 0.25 per cent pitch in 800-lb batches for 4 minutes. Placed in tightly covered boxes, the sand can be stored three to four days without encountering any difficulty. Cores are gassed 6 to 7 seconds with a pressure of 20 to 30 psi.

In discussing **Shell Core Use,** Frank B. Rote, Albion Malleable Iron Co., Albion, Mich., indicated that his firm's approach differed somewhat from the usual concept in that selection was based on the following order of advantages: Ease of core manufacture, use of hollow instead of solid cores, ease of shakeout, dimensional control and surface finish. Resin-coated sand is prepared in the foundry by the hot process, using liquid resin, hexamethyltetramine, wax and alcohol, and cores are blown. According to Mr. Rote, close metallurgical control must be maintained on the metal when resin-bonded cores are employed to prevent inverse chill or surface mottling.

Earl Woodliff, Detroit, who prepared the **Core Research Report** of the society a short time ago, stated that while it is lengthy, it contains considerable practical information. By use of selected charts from the report he showed effect of the amount of oil, water, bentonite, cereal, iron oxide, type of sand, etc. on physical properties of the mix. He mentioned that some sands with a high iron oxide content cause trouble due to the high hot strength. In some cases, use of yellow sands instead of white silica type eliminated casting cracking due to the formers' plasticity at high temperature.

He recommended use of 33 per cent nitrogen type fertilizer to the oil-sand mix to improve baking quality and to speed the process.

Friday sessions started with a discussion of **Stress Analysis in Casting**

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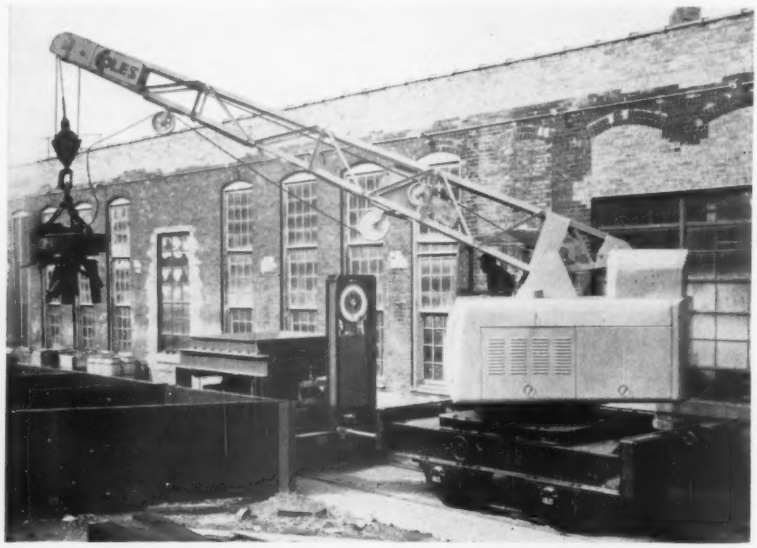

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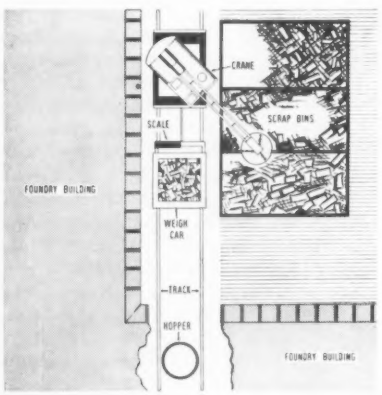

Plan showing layout of rail track, weigh-car and scrap-metal bins at the Dodge Manufacturing Company's Indiana plant foundry.

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Design. Joe W. Beckham, Texas Foundries Inc., pointed out that casting stresses are impossible to compute mathematically. Stress, however, is proportional to strain which can be measured. Thus, apparent values of stress can be computed by multiplying strain values by the modulus of elasticity of the metal used in the casting. Strain values are obtained by using brittle lacquer coatings or strain gages on parts subjected to a load.

Stress analysis work at Texas Foundries has indicated that stress often is concentrated at ribs and sharp breaks in contour of castings. Smooth contouring reduces stress concentration and makes the part better looking and easier to cast.

W. R. Gilmore, Superior Steel & Malleable Castings Co., covered stress analysis use at his foundry. Foundrymen should operate on two theses in casting design work: 1. There is no engineering substitute for cast parts. 2. Stress analysis is a design tool—not a substitute for common sense. Since few design engineers know the stress build-up in parts they design, being 800 to 900 per cent wrong in many cases, foundrymen have an educational job to do.

Strain gages, which measure in microinches per inch, are a quantitative, not qualitative, analysis of strain. Their use and that of brittle lacquers is adaptable to cast parts weighing from a few pounds to 30,000 or more pounds.

In answer to a question, the speaker pointed out that fatigue and yield strength are predictable by results from brittle lacquer coating and strain gage tests.

In a series of papers on **Dimensional Tolerances and Casting Inspection,** Carl Koerner, Central Foundry Division, General Motors Corp., presented the viewpoint of a large automotive production foundry. From the customer's viewpoint, tolerances and inspection methods are a matter of economics. Inspection procedures should be set up to pass commercially acceptable cast parts. A principal requirement in production foundries is that castings be uniform in size, weight and quality.

Central Foundry Division uses magnetic particle testing methods, radiography and sonic testing. With the last method, casting weight, shape, metal analysis and hardness must be within a given range or results will be undependable.

Good results have been obtained with Cobalt 60 radiography for inspection as well as for help in developing proper casting design and determining proper gating and feeding methods. Also castings rejected by magnetic particle and sonic test-

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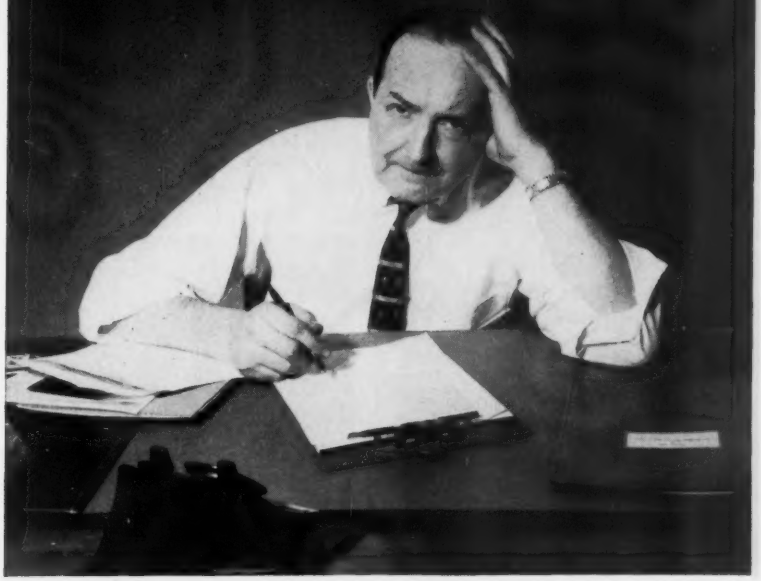

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G. E. Smith engineers have the broad background of foundry experience necessary to apply Kold-Set to core and mold making problems intelligently. They are backed up with a thoroughly qualified, service-minded engineering and research organization.

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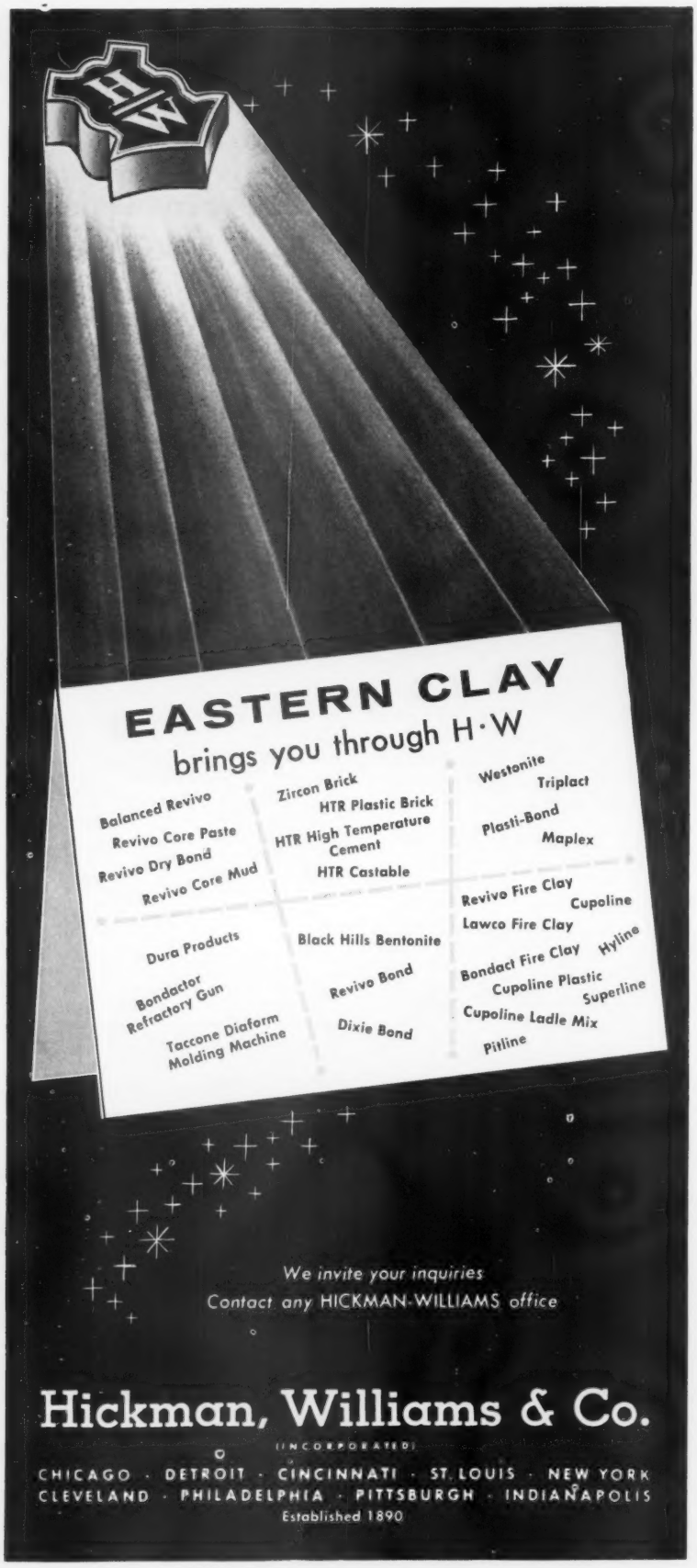
G. E. Smith service includes "in-plant" assistance in setting up the best method for making cores and molds with the equipment available. Engineers are qualified and equipped to recommend methods to achieve optimum results with Kold-Set at a minimum of expense.

Proved Performance

The Kold-Set process not only greatly speeds core and mold making. It has been proved in plant after plant to produce uniform, more accurate cores and molds with excellent surface and dimensional stability. It produces better castings at lower overall cost.



ing are checked by radiography to help eliminate causes of the defects.

W. T. Cole, Canton Malleable Iron Co., discussed inspection and tolerances from the point of view of a medium size foundry. To illustrate problems in meeting customer requirements he cited the example of a casting rejected by the customer for 18 points of nonconformance to the drawing. Mr. Cole had another drawing made and sent it with the rejected castings back to the customer who rejected the parts again for only eight reasons. Ultimately the original castings were accepted when purchasing agents were instructed on how to compare critical dimensions of the castings with those on the drawing.

Ernest J. Stockum, left, chairman of the Malleable T & O Conference, with James H. Lansing, society's technical and research director

The inspection and tolerance viewpoint of the diversified production foundry was covered by R. E. Rosien, Eastern Malleable Iron Co., Wilmington, Del. Tighter tolerances and better finishes are being demanded by customers. However, many customers do not know how to handle the closer tolerance castings. Their first machining cut takes away too much metal. Finish machining then makes the part undersize and foundries are blamed for supplying skimpy castings.

Because many blueprints and specifications are prepared by people unfamiliar with foundry work, foundrymen should find out what the customer does with a casting during processing so that the proper rough casting can be supplied.

Experience with CO_2 and shell cores at this foundry has provided incentive to improve oil sand coreboxes and core removal methods. Good equipment and practice can reduce tolerances and improve quality of oil sand cores.

Paul A. Green, Erie Foundries, Foundry Dept., General Electric Co.,

Erie, Pa., presented his shop's experience with **Pearlitic Malleable Production and Use.** Pearlitic malleable iron offers cost reductions, meets the needs of free machining characteristics and has good strength. Its damping characteristics also are good when compared with steel. Wearability also is good.

Spherulized pearlitic malleable is made with a manganese addition of 0.25 to 0.45 per cent to the same iron used for regular malleable. The manganese reduces sensitivity of the iron to cooling effects. Properties of the iron produced are 80,000 to 86,000 psi tensile strength, 50,000 to 58,000 yield strength, about 11 per cent elongation and 175 to 185 Bhn.

Production of pearlitic malleable at Link-Belt Co. was described by Carl O. Schopp of that company. Pearlitic malleable has been made at Link-Belt for about 25 years as processed malleable. It is melted in an air furnace and is free of chromium and other elements. Its wear resistance is about one and one-half times that of cold rolled steel. About 85 per cent of castings are poured in green sand, the balance in shell molds.

First item on the Friday afternoon program was a report by L. C. Marshall, Link-Belt Co., Chicago, on MFS Research Project No. 4. This project is an investigation of the basic properties of malleable iron, conducted for the society at Purdue University. Two phases are being considered: A study of the equilibrium of constituents between pouring and solidification and a study of the properties of the finished product. Investigations to date have dealt with long-term, high-temperature properties of malleable.

Known data indicate that the ultimate tensile strength of standard malleable iron falls off 10 per cent from room temperature to 700-800°F and drops sharply afterward. Elongation falls to 700-800°F, returns to normal at that temperature, then continues to mount. Pearlitic malleable shows similar variation, but with a greater spread than in the standard.

The new tests seem to indicate a sharp change in low-carbon malleable in the range from 800 to 860°F, although no change in ductility is observed. Data show an apparent trend in favor of low-carbon malleable in both the standard and pearlitic forms for temperature applications. Tests so far have not been carried much beyond 1000 hours, but longer test periods are contemplated.

Nodular Iron—Economics, Control and Properties in Production was discussed by H. W. Ruf, Grede Foundries, Milwaukee; T. E. Eagan, Cooper-Bessemer Corp., Mt. Vernon, Ohio; and Eric Welander, John Deere Mal-

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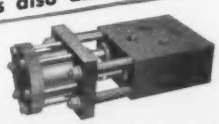

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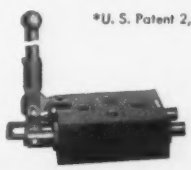

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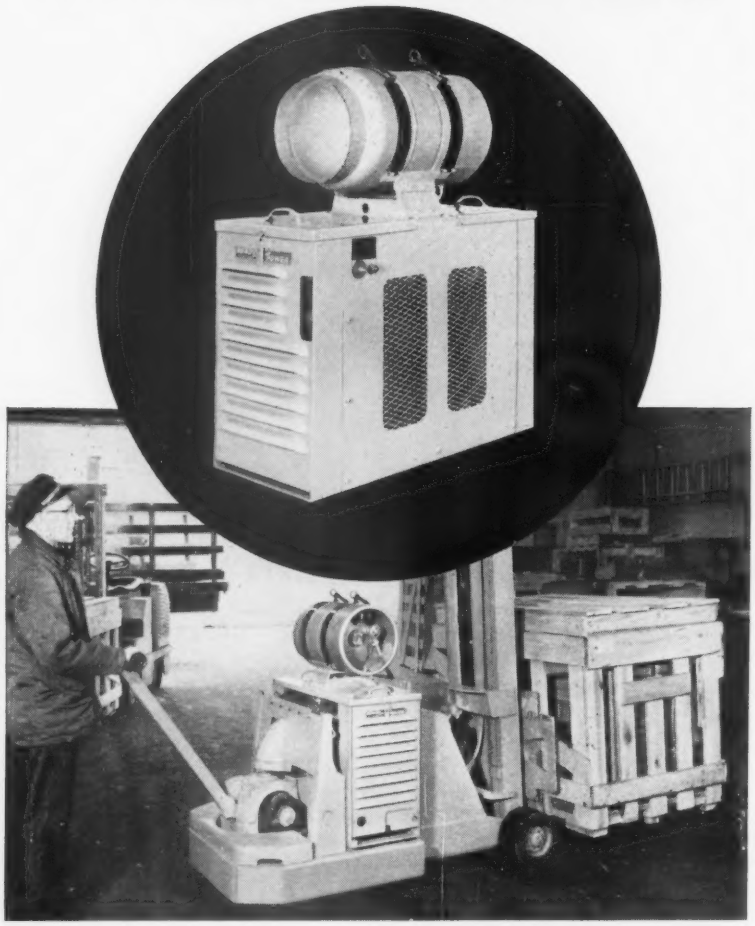

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leable Works, at East Moline, Ill.

Mr. Ruf described properties of nodular iron and the methods by which it is produced. He stated that problems of dross, flotation and pinholes in manufacture of the metal have proved greater than it was first thought they would be. Some of these problems still are not solved completely. Basic cupola melting is preferable, but more expensive than acid melting. High molten metal cost, royalties, alloys and high cleaning costs caused by large risers are factors which tend to make nodular iron production expensive. Hardness is affected by section size and other factors. Heat treating is an added cost, but improves casting quality.

Mr. Eagan discussed the physical properties of nodular iron. He stated that the metal can be used as cast, with a ferritized anneal or normalized and quenched. As cast, it is sensitive to section size, however, and annealing reduces that sensitivity considerably. He noted that nodular iron can be produced consistently on a day-to-day basis. He advised against welding it in stressed areas.

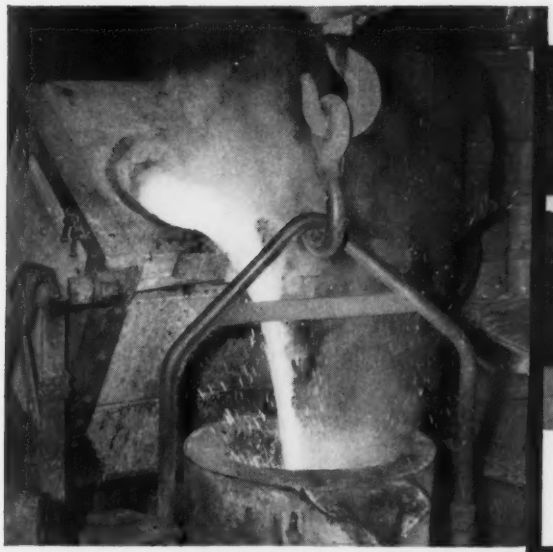
Mr. Welander explained that his company began an investigation of nodular iron because of increases in horsepower, size and weight of the equipment it manufactures. Larger casting sizes have led them to seek a metal which will meet the company's needs in the as-cast condition. As a result, the firm is going to try to produce a nodular iron which can be used as cast.

The concluding section of the program was devoted to **Scrap Reduction Programs.** Henry Felten, Peoria Malleable Castings Co., Peoria, Ill., described the average-job quality control system and the results it has produced at his plant. For details on this system, see "The Average-Job Quality Control System" on p. 123 of this issue of FOUNDRY.

Robert Cech, National Malleable & Steel Castings Co., Chicago, explained the staff organization his company has set up to cut scrap. At the heart of the program is the foundry engineer. He is fed information by the pattern engineer, the service and inspection department, foundry foremen and the finishing engineer, and he correlates these data.

At a dinner meeting Thursday evening, William F. Milliken Jr., head, Flight Research Department, Cornell Aeronautical Laboratory described technical aspects of sports car design.

The committee in charge of the conference program included, in addition to Messrs. Stockum and Lansing, Walter M. Albrecht, Chain Belt Co., Thomas M. Blank, Pennsylvania Malleable Iron Corp., and Hubert C. Stone, Belle City Malleable Iron Co.



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Low Frequency Furnaces. Foundries melting nonferrous metals and malleable iron report longer life from linings of Norton ALUNDUM cement. This high-melting, long-lasting cement is also prescribed for use in holding ladles and desulphurizing ladles.

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Cupola Furnaces. For back slagging cupolas the Norton ℞ is CRYSTOLON slag hole blocks. For capping the notch and lining the slag chute in front slagging cupolas, use CRYSTOLON bricks and cement. CRYSTOLON material is extremely resistant to attack by cupola slags thus providing needed protection in these critical areas.

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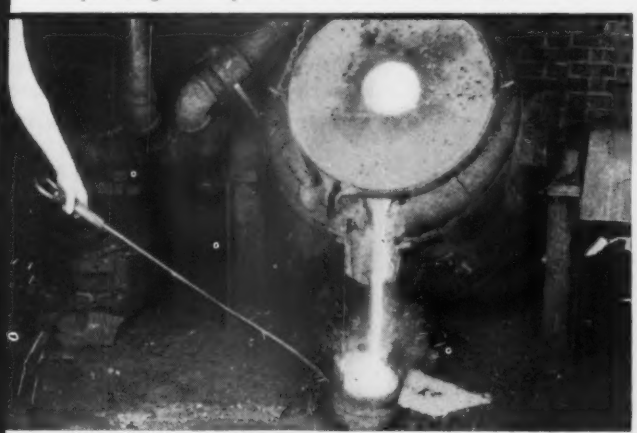

Crucible Furnaces. Both the cover of this tilting crucible furnace and its cement lining are made of CRYSTOLON refractory material, engineered for the user's particular needs. CRYSTOLON linings offer effective protection against flame erosion and thermal shock in many different furnace applications.

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Operating the machine which injects graphite-calcium carbide into acid-process cupolas at Western Foundry Co. Material is injected into metal at spout

By MURRAY COHEN

Injection Process Permits Use of

High-Scrap Cupola Charge

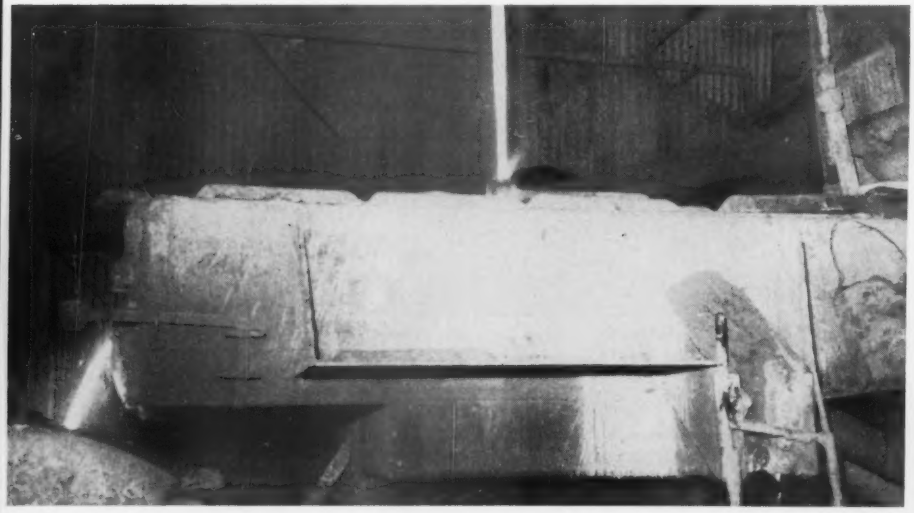
IN September, 1943, Western Foundry Co., Tyler, Tex., began operations as a small gray iron jobbing foundry with only 25 people on the payroll. Today, nearly 1000 men and women work for the company and its affiliates.

Western is a leading producer of cast iron soil pipe and the only manufacturer of plated plumbing brass fixtures in the Southwest. From its start with the job production of parts for stoves and heaters, the company branched out to agricultural machinery castings in 1945 and soil pipe and fittings in 1948. It organized Western Specialty Co. in 1952 (for its plumbing parts production) and in December, 1955, established Western Brass Co.

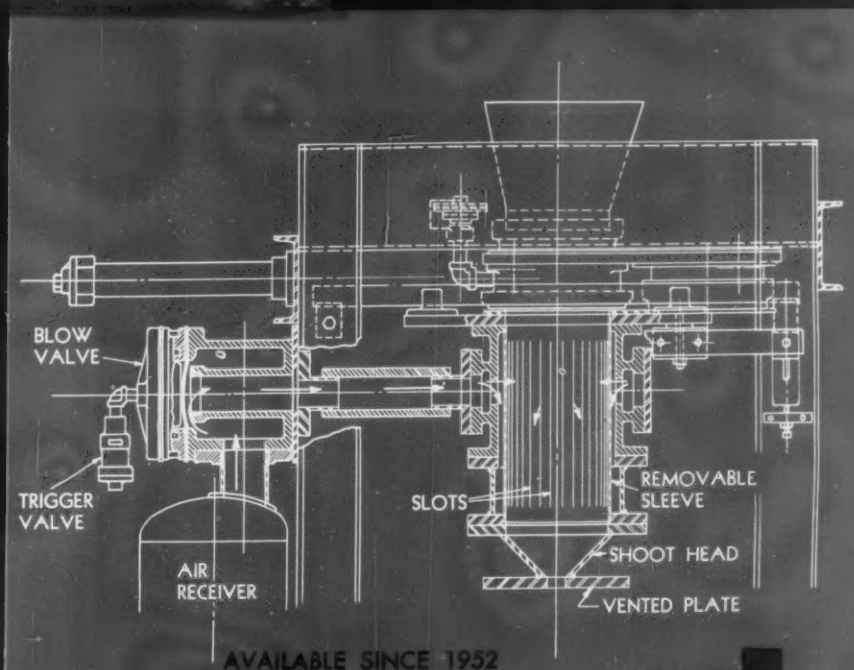
Western's management feels that its most important single production technique innovation to date is its use of graphite-calcium carbide injection in cupola operations. The company is among pioneer foundries in the 100 per cent application of the injection method for iron products.

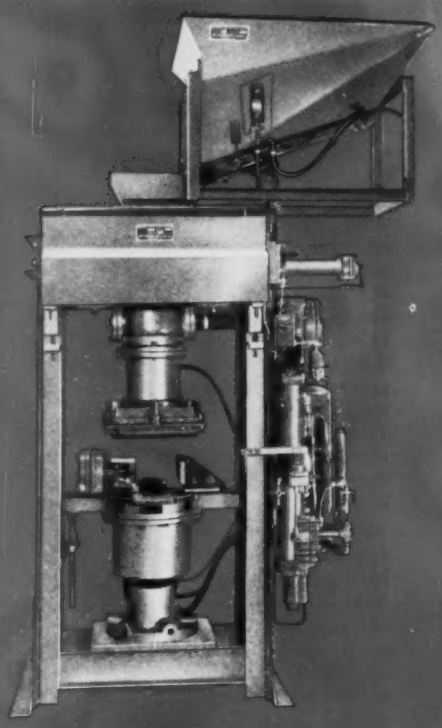
The difficulty of securing pig iron locally during the summer of 1955 first led Western to consider the application of this process to its production. The excellent results of the substitution of scrap metal for pig iron include a reduction in the cost of raw materials which alone more than compensates for the cost of the injection process. The process also

Tube in center of illustration is used to inject the 60-per-cent graphite and 40-per-cent calcium carbide mixture into cupola metal at the spout



Crane in yard handles large amount of scrap company uses





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ONE MACHINE DOES BOTH .....BLOWS OR SHOOTS CORES

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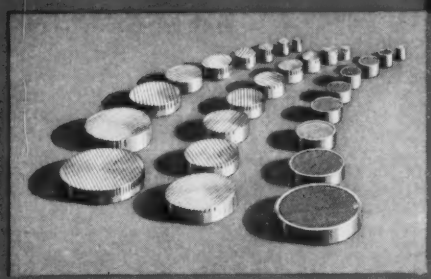
Demmler is by-far your best source for precision core box vents, manufactured by specialists who pioneered in the core blower industry. Many sizes, slot widths and screen meshes are available in brass and steel core box vents.

NEW *HL* 150 Mesh Vents

A new general purpose vent which practically eliminates the cleaning coarser screens demand. Write for literature on Demmler vents.



WM. DEMMLER & BROS.

KEWANEE, ILLINOIS

Circle 648 on Inquiry Card—Page 225

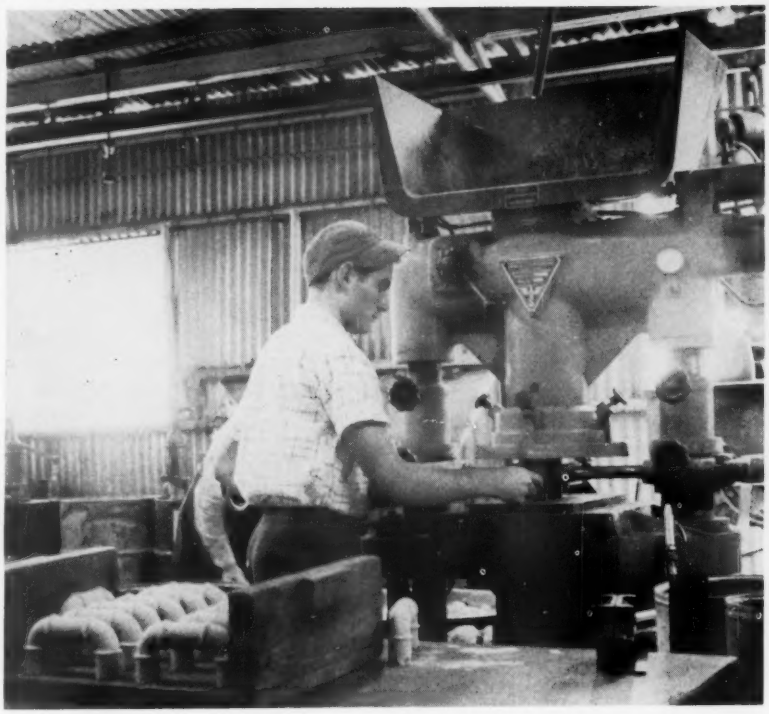
has reduced the amount of silicon needed, improved machinability of castings and reduced breakage during shakeout.

To acquire the huge amounts of scrap metal needed, the company has set up a network of sources throughout the country. Only 25 per cent of the scrap is purchased locally. The other 75 per cent is delivered either by railroad or by the company's 34 trucks, 12 of which are leased. Scrap purchasing is directed largely by long-distance telephone from Tyler. The company's goal is to have as many delivery trucks as possible return to the plant with a load of scrap.

The injection process in Western's two acid cupolas—one in the fittings shop and the other in the soil pipe shop—is accomplished with a 60-per-cent-graphite and 40-per-cent-calcium-carbide mixture. This material is injected into the metal at the spout with nitrogen through a 2-in. OD, ½-in. ID graphite tube. The cupolas are equipped with front-slagging spouts and melt a total of 32 tons per hour.

In the fittings shop, the injection requires about 15 seconds, and the period between injections varies from 30 to 40 seconds. Carbon content is raised from a spout analysis of 3.15 per cent to an as-cast analysis of about 3.50 per cent. Sulphur is reduced from spout analysis of 0.120 per cent to 0.060 per cent. Silicon is about 2 per cent. Fourteen tons an hour are melted.

In the pipe shop, injection of the graphite-calcium carbide mixture requires about 15 seconds, followed by withdrawal of the tube for about 25 seconds. Eighteen tons an hour are melted in this cupola.

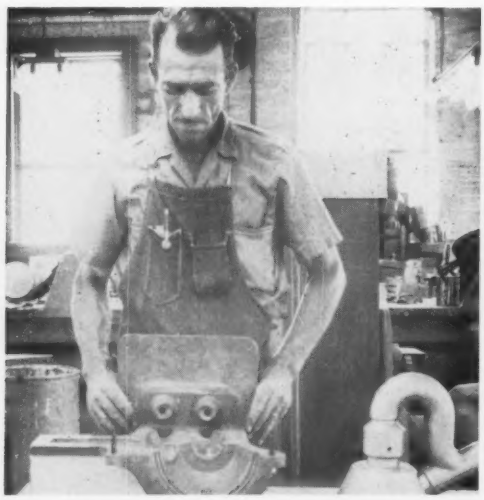


Hardening of cores by gassing them with CO_2 has been a great timesaver for the company; the cores are ready for use as soon as they are made

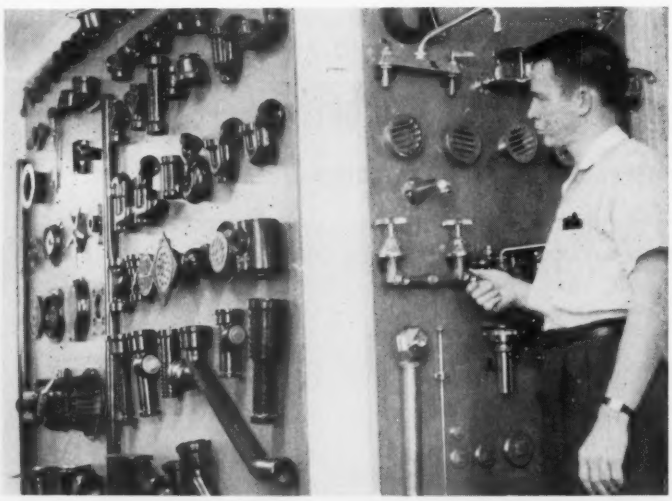
When Western first expanded into the manufacture of iron soil pipe, fittings and plumbing specialties, it erected a new plant on the company's site. Charging of the two No. 9½ cupolas is done with the assistance of a mobile electromagnet and crane. Charges are dumped into ground-level buckets, transported to the charging level and dumped into the cupolas. Usually, 2400-lb charges of metal are prepared in each bucket, with 295 lb of coke, 75 lb of limestone, 15 lb of silicon and 2 lb of manganese.

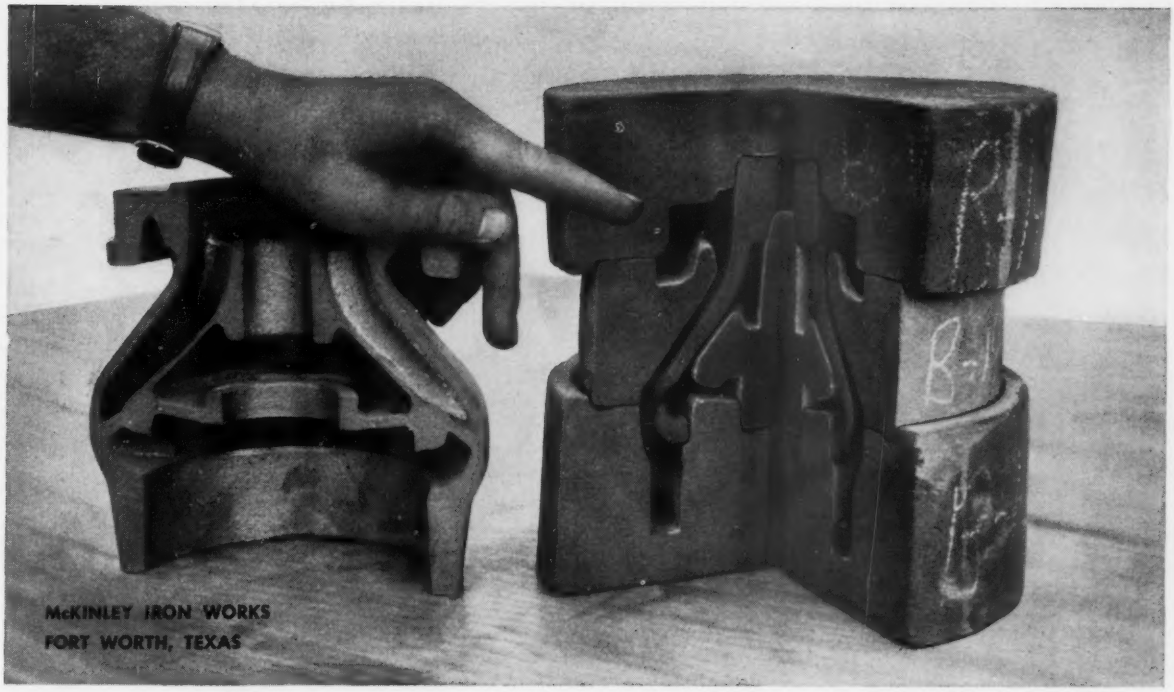
In the gray iron department, all fittings castings are carried by fork lift trucks to two large airless blast

Company uses plastic coreboxes, plans to use as many as possible



Display shows some of the various types of castings produced by Western, including gray iron soil pipe and plated red and yellow brass fittings





Nothing's too complicated for McKinley and Cities Service Delco Core Oil!

Talk about tough cores! McKinley Iron Works once had to make one for a rod 18 feet long with a triangular cross section measuring 2 inches by 6 inches.

Another time, they produced a casting weighing 22,000 pounds . . . and every day they turn some out weighing but a few ounces.

Yet, despite this tremendous diversification, McKinley manages to turn out 35 tons of castings a day, using only one core oil . . . Cities Service Delco #54.

"The reason I originally switched to Cities Service was because their lubrication engineer could give me exact specifications of their products," says President DeWitt McKinley.

"Other companies wouldn't or couldn't do this. The Cities Service engineer not only explained the makeup of the various Cities Service oils, but worked closely with me to fulfill my exact needs.

"The result was the selection of Delco #54 for all cores, a choice which has eliminated any chance of error among our employees and thus saved considerable time and money."

Like Mr. McKinley, you'll find a Cities Service Lubrication Engineer is ready and willing to help you find the precise type of core oil suited to your foundry operation. Call him in for a talk. Or write: Cities Service Oil Company, 20 North Wacker Drive, Chicago 6, Illinois.

Getting the Shakedown, McKinley casting has core sand removed. Cores always have good collapsibility, thanks to Cities Service Delco #54 Core Oil.

Big Core, Big Casting strike interesting contrast with smaller core and casting in picture at top. McKinley has made castings ranging from a few ounces to 22,000 pounds, using one core oil . . . Cities Service Delco #54!

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QUALITY PETROLEUM PRODUCTS

SAVE

WITH

Acme

MELTING POTS
INGOT MOLDS

Designed by
FOUNDRYMEN...
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You'll find it pays to standardize on Acme melting pots and ingot molds. They reduce down time and replacement costs because they're cast from a special iron formula that combines strength with high temperature resistance. They improve quality and reduce rejects, too, because they're designed for even heat distribution without hot spots. If you melt any non-ferrous metals, take advantage of our more than 30 years' experience in this field. It's your assurance of consistent high quality in Acme melting pots and ingot molds . . . designed *by* foundrymen, *for* foundrymen.

Quick delivery anywhere in the United States. Write for size list showing 40 standard sizes.

Acme FOUNDRY CO.

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units, where they are cleaned. Castings then are ground and placed on a conveyor which carries them through an oven, dips them into a hot-tar bath and deposits them in the shipping yard.

Soil pipe is transported from the floors where it is cast to an airless blast pipe cleaning machine. After being cleaned by that unit, the pipe is inspected, ground, tested, heated and dipped. Western is believed to be the first foundry west of the Mississippi to use an airless blast machine to clean soil pipe. Management estimates that the machine has reduced soil pipe cleaning time to about one-third of what it was previously.

Uses CO_2 Process

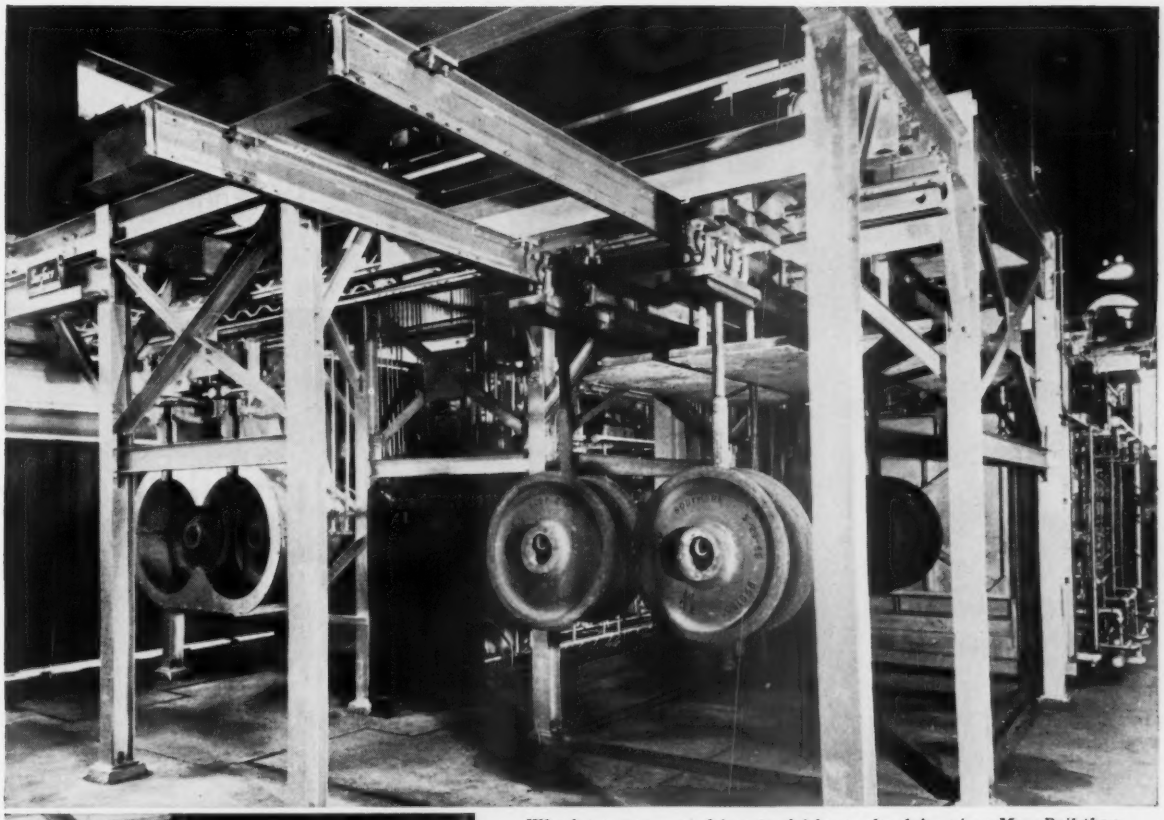
Two progressive features in production of cast iron are incorporated in Western's increasing use of plastic core boxes and of CO_2 hardening of smaller cores. The latter technique, says Israel Smith, president of Western, has been found to be a big time-saver. The plastic coreboxes are light, cheap and easy to construct. The company's goal is to have as many of the plastic type as possible in use as soon as it can.

The newest Western structure was completed early in 1956, after Western's purchase, in December, 1955, of the plated plumbing brass line of Barnes Mfg. Co., Mansfield, Ohio. A modern brass factory, machine shop and polishing and plating department were installed. Most of the equipment and some of the key personnel of the Ohio firm's brass department were brought to Tyler.

In the brass department, crucibles are employed to melt both yellow and red brass. Temperature is controlled with a direct-reading thermocouple. Carbon crucibles are pulled from the gas furnaces, slagged and employed as pouring ladles. Brass castings are cleaned by airless blast, rough ground and taken into the specialized machine shop. After being machined on automatic equipment, castings are polished, inspected and plated. They are degreased and cleaned by acid, after which they are copper-plated, nickel-plated and chrome-plated. Assembly of component parts produces the finished brass plumbing fixtures.

Names Resin Representative

Marblette Corp., Long Island City, N. Y., producer of epoxy and phenolic resins, has named Ram Chemicals Inc., Gardena, Calif., to be its western sales and service representative. Marblette also has appointed Bourke & Mabee, Toronto, Ont., Canada, as representative in eastern Canada.



Wheels are transported in sets of 4 by overhead American MonoRail thru heat treating operation.

American MonoRail deposits red-hot wheels in insulated pits.

Railroad car wheels travel by

AMERICAN MONORAIL

- get heat treated while aboard

The first ride these wheels ever take is aboard an American MonoRail which expresses them red-hot to insulated pits where they cool slowly for 5½ hours.

After removal from the pits by MonoRail crane, the wheels are loaded in sets of 4 on MonoRail hangers which transport them thru two furnaces for double heat treating.

Experienced MonoRail engineers will tailor-make a cost-saving handling system from standard parts to fit your specific needs.

Write today for Bulletin C-1.

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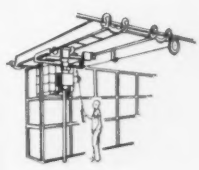
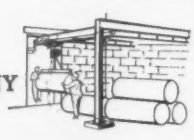
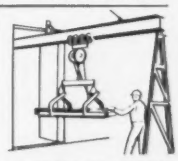


STACKER CRANE



MANUAL MONORAIL



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Protection
For Foundrymen

(Goggle shown is Model No. 484 chemical goggle)

This man is Safe and Comfortable behind his

AO FLEXIBLE MASK GOGGLE!

Here's a moderately priced, lightweight goggle that fits snugly and comfortably . . . with ample clearance for wear over most personal or Safety Ry glasses. Very important: the interchangeable acetate lens is optically correct while giving quality protection against impact. Note the wide field of vision for comfort, safety and job efficiency. Lens is easily removed and replaced . . . elastic headband is quickly adjustable. Both the chipping and chemical models of this goggle are acid and alkali-resistant, chemical goggles have solid plastic frame with four indirect ventilation ports which reduce fogging.

No. 482 Chippers' Goggle, Clear Frame, Clear or Green Lens
No. 483 Chippers' Goggle, Green Frame, Clear or Green Lens
No. 484 Chemical Goggle, Clear Frame, Clear or Green Lens
No. 485 Chemical Goggle, Green Frame, Clear or Green Lens

Always insist on AO trademarked lenses and frames. Your nearest American Optical Safety Products Representative can supply you.

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It's Cooler behind AO's 351A Air Conditioned Goggle!

This is the goggle for work in tight, close places where hot and humid conditions are a problem — as around fire boxes and open hearth checker chambers. Specifically designed for extra ventilation to keep lenses from fogging — extension rings have almost twice the usual ventilation area at no sacrifice of strength or impact resistance.

QUICK FACTS

- Individual eyecups — fit contour of each eye. Low set for wide angle vision with many ventilation perforations. Won't conduct heat or electricity.
- Ball-chain, insulated bridge, comfortable, easy-to-adjust.
- Headband of one-piece rubber, easily adjustable.
- Rubber cushions available around eyecups at slight extra cost.
- 50 mm regular Super Armorplate or 6 Curve Super Armorplate clear or Calobar lenses. Medium, dark, extra dark.

On hot jobs — keep workers comfortable, more efficient with American Optical Sweatbands.

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Industry Briefs

AMERICAN Brake Shoe Co., New York, has organized a new Engineered Castings Division to integrate five foundries and co-ordinate sales. The new division will produce a variety of plain and alloyed iron and steel castings. Brake Shoe foundries integrated by the move are located at Medina and Rochester, N. Y.; Mahwah, N. J.; South San Francisco, Calif.; and Melrose Park, Ill. They include two which comprised the company's former Engineered Castings Division plus three from the former Brake Shoe & Castings Division. Several weeks ago, Brake Shoe formed a Railroad Products Division which integrated four of its divisions serving the railroads.

Lake Erie Foundry Co. has purchased outright the land, buildings and equipment formerly operated by Washington-Fillmore Foundry Co. at 143 Fillmore Ave., Buffalo 10. The former premises of Lake Erie Foundry Co., at 218 Chicago St., Buffalo, were destroyed by fire in July, 1955. Reinhold D. Loesch, president of the company, states that he will operate with his original organization and will make extensive alterations in the new facilities, including installation of new equipment.

Electric Steel Foundry Co., Portland, Oreg., is constructing a new mechanized plant on a 20-acre site at Port Coquitlam, British Columbia, Canada, about 20 miles from Vancouver. It is scheduled for production in September with a capacity of 150 tons per month. Ultimate capacity is to be 1000 tons per month.

Selas Corp. of America, Dresher, Pa., has formed a European subsidiary to be known as Selas Corp. of America, European Division S.A. Headquarters are in Geneva, Switzerland. Six European companies have acquired licenses to Selas processes, and the Swiss office will work with these firms.

Webster Mfg. Co., Tiffin, Ohio, has purchased assets of the Eugene C. Stacy Load Binder business, Tiffin, and has formed a wholly owned subsidiary, Stacy Load Binder Co. Webster Mfg., which manufactures elevating and conveying equipment for handling bulk materials, will produce the castings for the Stacy load binding device.

Chas. Taylor Sons Co., Cincinnati, a subsidiary of National Lead Co., has opened a district sales office at 5845 Greenbrier Rd., Atlanta, Ga., to serve Georgia, Alabama, Tennessee, South Carolina, North Carolina, Mississippi and Florida. Manager of the office is Stafford T. Lantz. The firm manufactures special refractories.

Wehle Electric Co., Buffalo, has purchased F. Dorries & Sons, nonferrous foundry and machine shop, Buffalo. The foundry will continue operations under the management of W. E. Dorries, and an addition to its facilities will double its capacity.

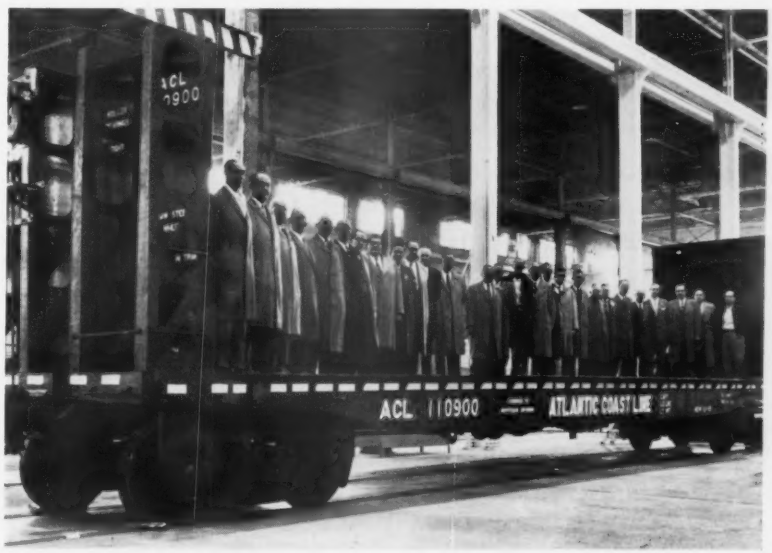
Harrison Division, Worthington Corp., Harrison, N. J., has established an industrial centrifugal compressor sales department which will handle all industrial centrifugal compressor engineering, manufacturing and sales. Everett C. Schmachtenberg, formerly assistant to the manager of engineering at Harrison, will head the new department.

Magnaflux Corp., Chicago, has completed a 10,000-sq-ft addition to its main plant at 7300 W. Lawrence Ave. The new space increases the assembly area by a third and will be devoted to additional production operations.

International Foundry Supply Co. has been established in Reading, Pa., and will offer a line including such items as melting furnaces, mixers and imported supplies and fluxes. Telephone number is 60794.

Milwaukee Chaplet & Supply Corp. has moved to 8656 West National Ave., Milwaukee 14, Wis. Telephone number is Spring 1-1111.

Arwood Precision Casting Corp., Brooklyn, N. Y., and **Hitchiner Mfg. Co.,** Milford, N. H., have become licensees of the investment "X" proc-



800 CAST STEEL UNDERFRAMES: American Car & Foundry Division, ACF Industries Inc., started production recently on 800 70-ton capacity pulpwood cars at its St. Charles, Mo., plant. They were ordered by the Atlantic Coast Line railroad, which specified that they be equipped with one-piece cast steel underframes manufactured by General Steel Castings Corp., Granite City, Ill. They also will use cast steel upright and post bulkheads designed by General Steel. View above shows the first car produced and representatives of the Atlantic Coast Line, American Car & Foundry, General Steel and other suppliers

ess, a lost-wax technique which makes possible production of larger investment castings than could be made previously—up to more than 50 lb in weight.

Republic Steel Corp., Cleveland, has appointed Lee Keller & Associates, 1014 Franklin St. SE., Grand Rapids, Mich., to handle the sale and distribution of its material handling equipment.

Sorbo-Mat Process Engineers now is located at 106 South Hanley Road, St. Louis 5, Mo.

Steel Advisory Committee Is Reactivated by BDSA

Business and Defense Services Administration has reactivated the Steel Castings (Carbon and Low Alloy) Industry Advisory Committee. First meeting of the group was held in Washington Feb. 6. Members of the committee are:

C. E. Grigsby, American Steel Foundries, Chicago; B. P. Hammond, Continental Foundry & Machine Division, East Chicago, Ind.; A. S. Breithaupt, Dodge Steel Co., Philadelphia; J. E. Farrell, Farrell-Cheek Steel Co., Sandusky, Ohio; H. F. Park Jr., General Steel Castings Corp., Granite City, Ill.; J. L. Worrilow, Lebanon Steel Foundry, Lebanon, Pa.; T. H. Harvey, Ohio Steel Foundry Co., Lima, Ohio.

E. F. Marquardson, Pacific Steel Casting Co., Berkeley, Calif.; A. M. Slichter, Pelton Steel Casting Co., Milwaukee; F. M. Robbins, Ross-Meehan Foundries, Chattanooga; E. F. Judge, Scullin Steel Co., St. Louis; R. L. Gilmore, Superior Steel & Malleable Castings Co., Benton Harbor, Mich.; D. P. Murphy, Symington-Gould Corp., Depew, N. Y.; T. H. Shartle, Texas Electric Steel Casting Co., Houston; K. C. Gardner Jr., United Engineering & Foundry Co., Pittsburgh.

Steel Founders' Society Plans Annual Meeting, March 18-19

Steel Founders' Society of America will hold its 55th annual meeting March 18-19 at the Drake Hotel, Chicago.

Featured speakers on the program will include Herman Stuetzer, partner with the firm of Lybrand, Ross Bros. & Montgomery, Boston, on the subject of "Depreciation for Tax Purposes"; J. Lewis Powell, program co-ordinator, supply and logistics, Office of the Assistant Secretary of Defense, Washington, who will discuss "The Production Allocations Plan"; and Dr. Murray Banks, clinical psychologist of New York, whose subject will be "What To Do Until the Psychiatrist Comes."

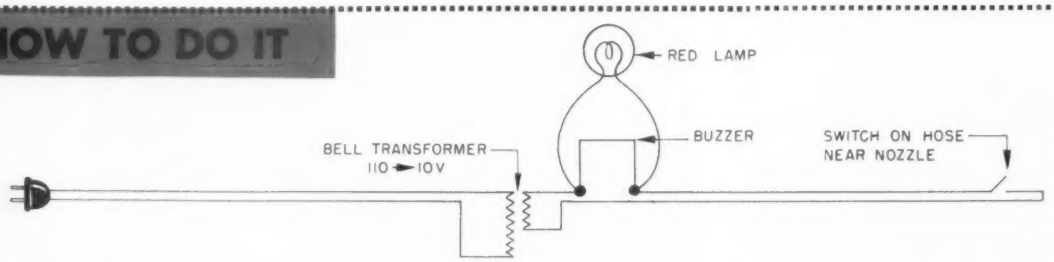
Howard F. Park Jr., president of the society and vice president, General Steel Castings Corp., Granite City, Ill. will preside at the meeting.

Subjects of key interest to society members will be presented by the respective chairmen of the society's major committees. These include Henry D. Phillips, Technical Research Committee and executive vice president, Adirondack Foundries & Steel Inc., Watervliet, N. Y.; Marion J. Allen, Advertising & Public Relations Committee and director, personnel and public relations, American Steel Foundries, Chicago; I. M. Emery, Technical & Operating Committee and president, Massillon Steel Casting Co., Massillon, Ohio; Roy A. Gezelius, Product & Market Development Committee, and assistant vice president, General Steel Castings Corp., Eddystone, Pa. and Claude L. Harrell, Program Appraisal Committee and president, Sterling Steel Casting Co., East St. Louis, Ill.

Willard P. Dudley, vice president—operations, Ohio Steel Foundry Co., Lima, Ohio, will discuss safety activities from the executive viewpoint, and A. J. McDonald, Washington representative of the SFSA and formerly vice president, American Steel Foundries, Chicago, will report on current activities in Washington as related to the steel castings industry.

The Lorenz Memorial Medal and the T & O Medal will be awarded at the Monday noon luncheon. Certificates will also be presented at that time for outstanding service to the industry.

HOW TO DO IT



Signal System Aids Cupola Man In Obtaining a Uniform Lining

By JAMES AFFINITO
Melting Foreman
Mattison Machine Works
Rockford, Ill.

SIGNAL SYSTEM helps in obtaining a good, even cupola patch of proper thickness with an air placement refractory gun. Previously, when the man in the cupola wanted to change position, he had no way of signaling the materials loading operator to stop the machine. As a result, all of the material was applied without stopping the machine, and the cupola diameter would vary from time to time. In addition, lining thickness was not uniform, and refractory mix was wasted.

With the signal system, the cupola man can have the machine stopped whenever he wants. The accompanying sketch shows how the gun is wired. The wire running down the hose is taped about every 8 in., and the pushbutton switch is taped near the nozzle. The red lamp and buzzer are mounted in the area where the machine is located and in a position where it can be viewed easily by the operator who loads the machine.

Do you have any tricks of the trade tucked away with your foundry experience? Why not release them to fellow foundrymen? FOUNDRY will pay a minimum of $15 for each idea submitted and published. Send a photo or drawing with your idea.

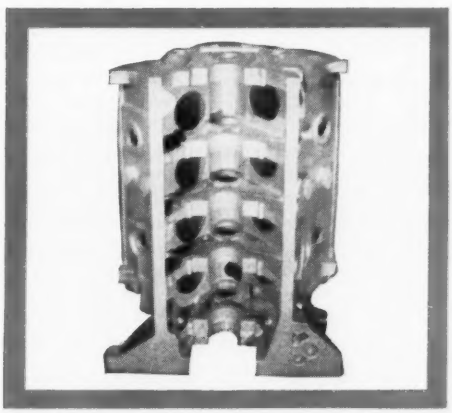
NO DRI G-128

— a better mold coating by THIEM

approved by QUALITY CONTROL

the foundry's fastest growing profession

How effective is your mold spray?



V-8 engine block by leading automotive manufacturer — cast with NO DRI G-128 mold coating.

Management and Quality Control have found their answer to a better mold coating in NO DRI G-128.

NO DRI G-128 is remarkably resistant to cracking and spalling at temperatures up to 2850°F — produces a reducing atmosphere — forms a gas film at the sand interface — prevents metal penetration— eliminates sand sintering.

NO DRI G-128 is a solvent type coating which is cut back with NO DRI Thinner. No water is added. It is extremely easy to mix — smooth flowing — eliminates extensive torch drying — requires no tunnel ovens or banks of drying torches.

You can depend on THIEM NO DRI G-128 where casting appearance counts. Write, wire or phone today for *more important reasons why* a trial order can be your best investment for *"Quality Control."*

Thiem

THIEM PRODUCTS, INC., MILWAUKEE 19, WISCONSIN

Manufacturers of foundry products exclusively — Ferro Kote • Krome Kote • Dri Lite • NF-100 • No Dri G-128 • Mold Lite • Krome Kote Z Krome Kote NF • Core Oil • Kwik Set • Mudding Compound Chill Kote • Core-Hesive Core Paste

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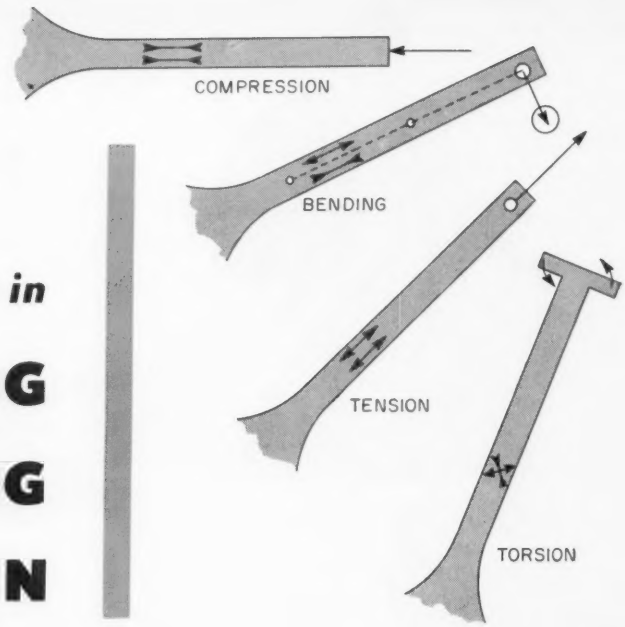
Fig. 1—Drawings at right show the four basic types of stress which are carried by a part or by sections of a casting



Testing Methods Valuable in

IMPROVING CASTING DESIGN

By FRANK S. CATLIN
Magnaflux Corp.
Chicago

WITH correct design, castings have great competitive advantages over parts produced by other types of fabrication. With poor design, they are unnecessarily complex, clumsy in appearance and difficult and expensive to cast.

The object of this paper is to show how the market for castings can be increased by the use of testing tools such as magnetic particle testing and by attention to stress analysis in design. Test specifications also are an important aspect of this problem.

To do the job, to expand their markets, foundrymen must educate their customers to employ better stress design for castings and to use better, realistic specifications.

Stress Design—From a viewpoint of stress, design factors are not complex, for they are easy to measure and to understand. Fig. 1 illustrates the four basic types of stress—compression, bending, tension and torsion. For two reasons, stress problems and design weaknesses almost always arise from bending.

First, tension or torsion in a casting usually are well provided for by mathematical design. Pure tension or torsion are rather easy to design for by straightforward calculation. Second, bending often occurs where it should not or where it is not foreseen from the main loading of the part. In addition, bending throws a high tension on one surface and compression on the other.

Stress concentrations at changes in section are impossible or next to impossible to calculate in mathematical design, especially in bending. Most cast shapes contain many changes of shape or section, points at which high stress problems occur and may not be well provided for by the design. Even when the main loading is tension or torsion, bending almost always is present and often is not provided for except by a rather blind "factor of safety." Fig. 2 shows some examples.

The bending areas at the junctions of various sections usually are the most highly stressed sections; good design thickens the wall and smooths the fillets to handle the stress Experimental stress analysis with brittle lacquer quickly shows up the high-stress area and indicates how the stress is concentrating and why. This information points to the ordinarily simple changes in shape that will correct the design and lower the concentrations. It also shows which areas are carrying the highest stress and what the direction of that stress is.

With a properly stressed design, the resultant shape always is easier to cast and usually is lighter. In addition, the foundryman knows what areas on the part are critical. He knows where small defects would be serious and where large cracks would not contribute to failure.

Type of defect, its location in relation to the stress and its direction are all-important. These facts are the basis for logical but simple specifications for magnetic particle test-

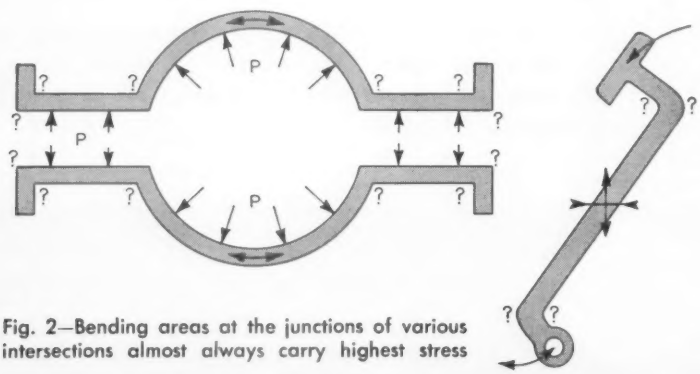
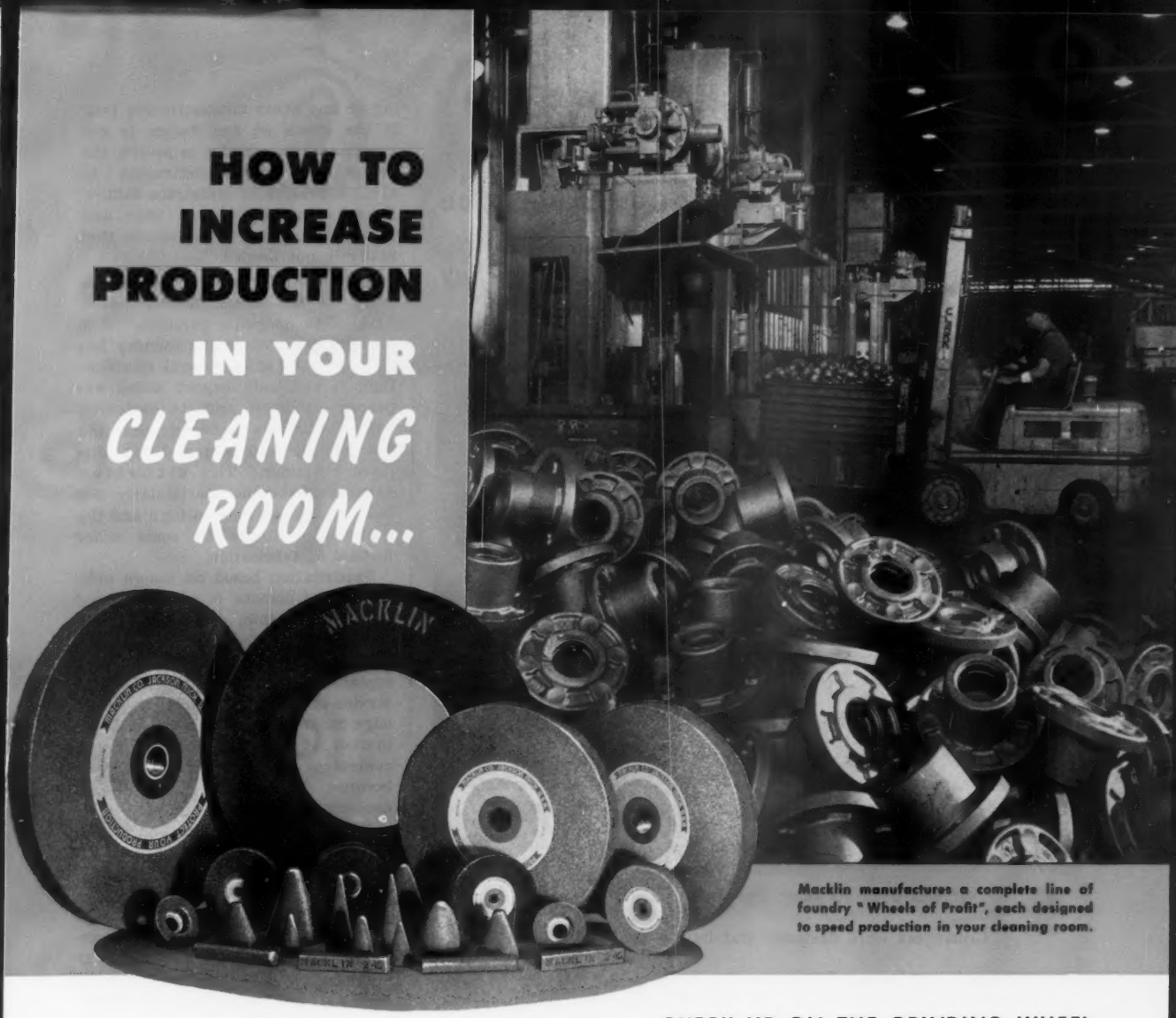


Fig. 2—Bending areas at the junctions of various intersections almost always carry highest stress

HOW TO INCREASE PRODUCTION IN YOUR *CLEANING ROOM...*



Macklin manufactures a complete line of foundry "Wheels of Profit", each designed to speed production in your cleaning room.

Don't let your cleaning room be a bottle neck to expanded foundry production! Specify Macklin Foundry Wheels with the improved B-5 bond. Tests prove the B-5 gives up to 30% longer wheel life. It cuts faster and the wheels stay sharp with a minimum of dressing.

HERE'S PROOF OF PERFORMANCE—

OPERATION: Stainless and high-speed steel billets and ingots. (Swing frame, 20 x 2½ x 6")

	Wheel Life	Stock Removal
Macklin	13¾ hrs.	330 lbs.
Wheel A	14 hrs.	220 lbs.

OPERATION: Malleable castings. (Floor stand, 20 x 2 x 10")

	Wheel Life	Stock Ground Over the Wheel
Macklin	24 hrs.	17 tons
Wheel B	18 hrs.	11 tons

OPERATION: 3% Titanium Steel Billets. (Swing frame, 16 x 2 x 6")

	Stock Removal
Macklin	36 lbs. per hr.
Wheel C	18 lbs. per hr.

OPERATION: Gray Iron Castings. (Portable, 6/4 x 2 x ⅜")

	Wheel Life
Macklin	17-20 hrs.
Wheel S	12-15 hrs.

CHECK-UP ON THE GRINDING WHEEL PERFORMANCE IN YOUR FOUNDRY

- Is the rate of production up to your top requirements?
- Are wheels removing the proper amount of metal in relation to the amount of wheel used?
- Do wheels stay sharp and hold proper contour?

YOUR MACKLIN FIELD ENGINEER WILL BE GLAD TO HELP YOU GET THE RIGHT ANSWERS TO THESE QUESTIONS. **To arrange for an on-the-job demonstration, *without obligation*, write today!**

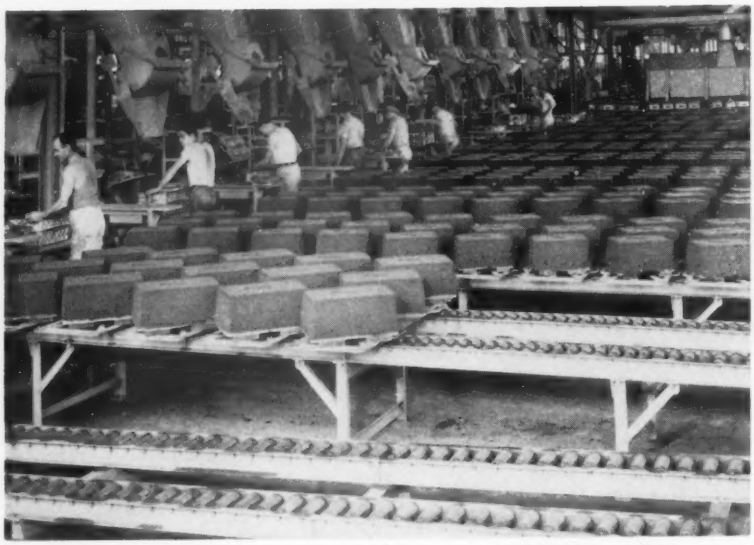
MACKLIN company

Dept. 22, Jackson, Michigan

Circle 654 on Inquiry Card—Page 225

OVER 50 YEARS of Engineering and Manufacturing Experience

make MATHEWS CONVEYERS your best buy



A typical roller conveyer system applied in a modern foundry producing castings for textile machinery.

It was over 50 years ago that the first Mathews Conveyers were designed and built—and from that early equipment has come the development of the Mathews **continuous flow** conveying systems of today. In these 50 years Mathews engineers have developed a complete line of gravity and power conveyers and special conveying machinery to serve the metalworking industries in the United States and Canada. Whatever is required in the way of modern conveying machinery, you'll find that Mathews has it, and that Mathews Conveyers are your best buy.

MATHEWS CONVEYER COMPANY . . . ELLWOOD CITY, PENNA.
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MATHEWS

(Member Foundry Equipment Manufacturers Association)

ing or any other nondestructive test. If the stress on the design is not known and the service is severe, the foundryman must overinspect to avoid expensive or disastrous failure. In so doing he wastes time and money trying for a perfection that really is not needed.

Test Specifications — If the so-called specification merely says, "Test with magnetic particles," it is meaningless. When the foundry has to work to a blind general specification, it can only expect added expenses for itself and its customer, with arguments between him and the foundry and him and his ultimate customer. This situation penalizes everyone, particularly the foundry if costs get too high and the customer switches to some other method of fabrication.

Specification based on design indicates what defects, in what area and in what direction, are to be considered serious. They also show what cracks, of what size, are fully acceptable and will not impair the service of the part. With this knowledge, inspection is much easier. Elimination of critical defects through control of castings also is simpler because only critical areas are of concern.

Education of designers and buyers of castings on these points is a big job, and foundrymen also may need such education. The basic fact is that the ultimate user of castings needs only reliable service. We cannot stress too much that 100 large cracks in 100 castings may have no effect on service reliability, whereas one small crack in a critical spot on 1 of 100 castings may cause all sorts of trouble.

Magnetic Particle Testing—Magnetic particle testing provides one way to save money in the production of castings and at the same time assure consistently acceptable quality. Because such testing is flexible, it is used in a great variety of ways to meet the degree of sensitivity required. The most sensitive inspection of castings is, of course, the slowest, and it makes the testing the most expensive. If the specifications have been arrived at intelligently, even the slower forms of this testing can be speeded up, however, and often a much simpler form of the test can be used to give an inspection which is less rigorous, yet assures fully reliable service.

Where the requirements of quality in a casting are such that subsurface, cracklike faults must be found, dry powder and high-intensity local magnetization supply maximum sen-

Next month!

WE'LL BE MAKING AN IMPORTANT ANNOUNCEMENT OF INTEREST TO ALL STEEL MAKERS REGARDING

Lectromelt*

FURNACES AND EQUIPMENT

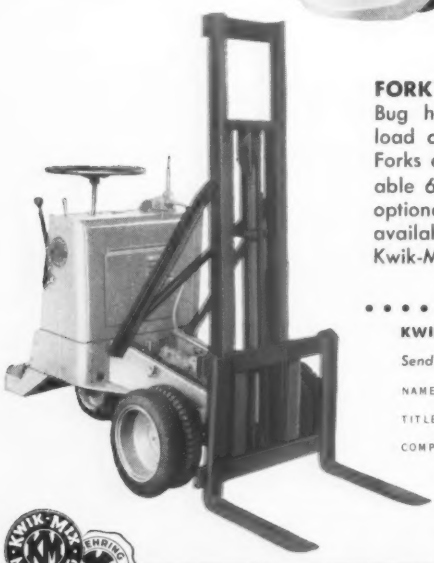
Users report they have stepped up production and reduced their costs with efficient, time-proven Lectromelt furnaces. For a copy of Catalog 9-A describing this equipment, write Lectromelt Furnace Division, McGraw-Edison Company, 314 32nd Street, Pittsburgh 30, Pennsylvania.

*Registered trademark

It's interchangeable 3 ways!

HOPPER BODY — At exceptionally low cost you can mechanize material-handling with this one basic unit and easily-changed attachments. For example — as a power wheelbarrow, Kwik-Mix S-10 Moto-Bug carries 1500 lbs. of bulk materials in 10 cu. ft., gravity-dump hopper. It climbs 16% ramps or grades fully loaded, turns in 61-inch radius, clears 33-inch aisles, doorways—works inside warehouses, box cars, elevators. (15 cu. ft. hopper body optional.)

PLATFORM — Change from hopper body to 32-inch x 4-foot platform, and you have a heavy-duty, ¾-ton truck. Flat-bed platform tilts for easy pull-away when unloading. Sturdy, all-welded, steel bed is rib-reinforced — has stake pockets for sideboards.



FORK LIFT attachment on S-10 Moto-Bug has 1000-lb. capacity (at 15-in. load center), and 6-foot lifting height. Forks are 20 or 30 inches long, adjustable 6 to 32 inches wide. Tilting mast optional. Big R-15 Moto-Bug also is available with special attachments. See Kwik-Mix distributor, or write us today.

KWIK-MIX Company, Port Washington, Wis.

Send us free copy of new Moto-Bug catalog.

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KWIK-MIX MOTO-BUG® (Koehring Subsidiary)

sitivity. By "subsurface" I mean cracks which are from ¼ to ¾ in. or more below the surface. A high amperage current—up to 2000 amp or more—is forced through a 6 to 8 in. section of the casting, and powder is applied. This treatment induces a high-intensity magnetic field in the area, and both surface and subsurface cracks are found. On some few castings, this testing is justified. It permits chipping out the defect and weld repairing the area to give a large, complex cast body which could not be made in any other way, and it assures freedom from such cracks.

Surface Inspection Is Fast

Note, however, that the entire casting need not necessarily be inspected in this fashion. If the highly stressed areas are known or if only certain areas are likely to have subsurface cracks, this maximum sensitivity testing need be used only in these areas. In many ways, foundries and manufacturers are coming to feel that searching for subsurface cracks has been overemphasized greatly. If it is not necessary to find subsurface flaws, inspection is easier and much more rapid. Where it fills the need, surface inspection greatly speeds up inspection and even permits the use of semiautomatic equipment where the volume of castings justifies it.

In the simplest form, surface inspection can be accomplished by magnetizing large general areas of a casting with either prods or with loops of cable. While the casting is magnetized, a Magnaglo bath can be sprayed on the surface. A quick glance over this surface with a portable black light then reveals any surface crack quickly. A fluorescent indication follows the crack itself and marks its complete extent. Compared to the dry powder and local area inspection, this system can reduce time needed by 65 per cent or more. Even if a high-sensitivity, dry powder inspection for subsurface flaws is necessary, this quick black light test may be the easy one to use on pilot castings or as a regular sampling test right after cleaning.

The use of inspection to point out problems as they begin to occur is the real way of saving money by this tool. When there are clear indications of cracks on the surface of the part, an experienced man readily can see that some change in technique will correct the cause of cracking. Further, if cracks typically occur in certain areas, they can point to minor revisions of the design.

FERROCHROMIUM BRIQUETTES
Hexagonal in shape, they make ferrochromium addition to the cupola convenient and practical. Each briquette weighs approximately 3⅜ lb., contains 2 lb. chromium.

FERROMANGANESE BRIQUETTES
For use in iron as a manganese addition agent . . . and as a desulphurizer. Oblong shape for quick identification. Easy-handling 3-lb. size contains exactly 2 lb. manganese for addition without weighing.

SILICOMANGANESE BRIQUETTES
Have important uses in foundries for the addition of both manganese and silicon. These 3½-lb. briquettes contain exactly 2 lb. manganese, about ½ lb. silicon. Distinctive square shape obviates mistakes, makes handling simple.

FERROSILICON BRIQUETTES
Easy, practical way to add ferrosilicon to the cupola. Cylindrical shape, for ready identification. Two sizes: small—containing 1 lb. silicon; large—containing 2 lb. silicon.

Vancoram Briquettes for convenience and uniform results...

VCA IS HEADQUARTERS FOR EVERY MAJOR TYPE!

Briquettes are the easy, reliable, "no-mistake" way to make alloy additions to cast irons. And Vancoram Briquettes—quality controlled from the mine to you—are noted everywhere for their quality and uniformity of composition.

You can meet every major requirement from Vancoram's full line of quality briquettes.

They are available in bulk or packed in bags or pallet boxes, which permit easy storage and handling. Learn more valuable facts about Vancoram Briquettes from the VCA representative in your locality or from the following distributors of Vancoram products for the iron foundry:

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VANCORAM

Producers of alloys, metals and chemicals

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Foundry Developments

By EDWIN BREMER
Metallurgical Editor

REPRODUCIBLE degassing of molten aluminum can be accomplished by ultrasonic activation, according to a report, "Effect of Ultrasonics on Molten Metals" by Jones, Thomas and DePrisco. Accelerated degassing of No. 195 alloy was achieved at a nominal frequency of 15 kc. The greatest degree of acceleration appeared to occur with the ultrasonic energy introduced into the melt by a vertically oriented coupler face. Grain refinement also was accomplished.

At the 15-c frequency and within the energy levels utilized, RC-70 titanium proved to be a reasonably satisfactory coupler material. Wetting of the coupler face was found essential to deliver the elastic vibrations into the molten metal. The report is PB 121403 and may be obtained from the Office of Technical Services, U.S. Department of Commerce, Washington 25, for $3.25.

Cause of Pinholes

SUGGESTIONS for avoidance of pinholes in gray cast and nodular irons are given in an article, "Pinholing in Cast Iron and Its Relationship to the Hydrogen Pick-up From the Sand Mold" by Dawson and Smith in the June 1956 issue of *Journal of Research and Development* (Birmingham, England). Recommendations are the use of ample amounts of seacoal (6 per cent) and pitch (2 per cent) in the molding sand, and avoidance of combinations of traces of aluminum and titanium. In gray irons the amount of aluminum and titanium in the melting stock should be kept down. If ferrosilicon is used as an inoculant, the low aluminum type is desirable. In nodular iron a strict watch must be kept on the aluminum content of the melting stock, particularly on the aluminum content of the ferrosilicon. Titanium usually is controlled for other reasons.

Peeks Between Grains

NEW metallurgical research technique being developed and refined by scientists at U.S. Steel's Research Center, Monroeville, Pa., was conceived in France about 6 years ago. Termed "point probe microanalysis," the technique permits analysis of steel-specimen areas 10,000 times smaller than is possible by any other method.

Procedure involves use of an electron microscope containing a focused electron beam to excite x-ray emission from a region as small as a few microns in diameter. Characteristic x-rays emitted are analyzed by a crystal spectrometer. The method has wide application in metallurgy

for study of intergranular corrosion, analysis of segregates in metallic phases and in grain boundaries, measurement of interdiffusion during welding and plating, and determination of composition of fine precipitate particles.

Protective Coating

SIGNIFICANT improvement in the creep characteristics of 80 nickel-20 chromium alloys at 1975°F is reported for the National Bureau of Standards ceramic coating No. N-143, a barium silicate containing cerium oxide. The coating also effected almost complete inhibition of profuse formation of voids in uncoated specimens.

Diffusion rate at 1400°F of hydrogen through high-purity nickel coated with NBS A-418 ceramic coating containing chromic oxide as a disperse phase, was found to be less than 5 per cent of the diffusion rate through uncoated specimens although the coating was only about 1/40 as thick as the specimen. Creep rate at 1500°F and 1000 psi of ¼-in.-diam single-crystal specimens of high-purity nickel was unaffected by a change in atmosphere from reducing to oxidizing.

Complete information is available in report PB 121493 — "Effect of Ceramic Coatings on the Creep Rate of Metallic Single Crystal and Polycrystalline Specimens" by J. R. Cuthill and W. N. Harrison which may be obtained from the Office of Technical Services, U.S. Department of Commerce, Washington 25, for $1.50.

New Sand Test

TO DETERMINE properties of molding and core sands, a new hot-strength test was devised by Howells, Morey and Bishop. It is described in a report, "Properties of Molding Sands Under Conditions of Gradient Heating," which is available as PB 121540, from the Office of Technical Services, U.S. Department of Commerce, Washington 25, for 50 cents.

The new test reproduces in a compression test specimen the thermal gradients that surround a solidifying casting. A compressive strength-vs-temperature curve was relatively smooth and showed a continuous decrease instead of sharp peaks and valleys of the conventional test curve. Various molding and core sands were tested under conditions representing mold interface regions for castings that solidify at 2000 to 2400°F. It was found that hot strength and the modulus of elasticity do not predict the hot tearing susceptibility of steel castings. Instead a correlation exists between the dry density of the sand and bore cracking.

Puts Sun To Work

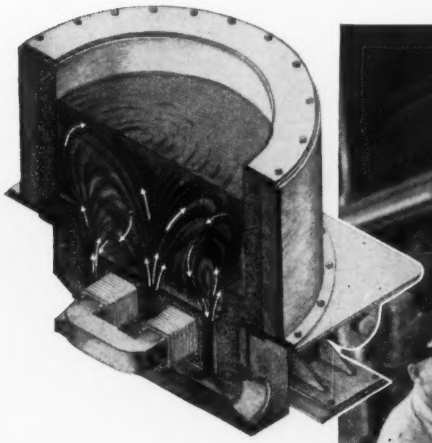
EXPANDING its activities into the high-temperature field, Arthur D. Little Inc., Cambridge, Mass., is completing a solar furnace to produce temperatures upward of 3500°F. Furnace is said to be significantly different in design than existing units, and is to serve as a model for others to be offered to other research laboratories. The firm long has been engaged in extreme low-temperature research.

Hard-to-melt Bronzes Successfully Handled

in

AJAX INDUCTION FURNACES

Brass and bronze foundries all over the country have found AJAX-TAMA-WYATT induction furnaces a reliable tool for melting silicon bronzes, aluminum bronzes, leaded bronzes, phosphor bronzes, and other high strength alloys. Operation is highly economical due to the good uniformity of the alloys, low ratio of rejects, drastic reduction of metal losses, and clean operating conditions. This recent development opens the field for the use of AJAX induction furnaces in all foundries where difficult-to-melt alloys are handled.



Cross section of AJAX-TAMA-WYATT twin coil induction furnace such as used at the Torrance Brass Foundry. Heat is produced within the molten metal in the secondary channels and conveyed throughout the melt by electromagnetic circulation, resulting in minimum metal losses and high uniformity of alloy. Temperature is automatically controlled.

(Photograph courtesy of Long Beach Press-Telegram, Long Beach, Cal.)

The furnace pictured here is melting aluminum bronze at the *Torrance Brass Foundry, Torrance, Cal.*, operating at a temperature of 2400 F, for the production of high strength centrifugal castings. This unit is rated 100 kw. Note also the clean, smokeless operation as shown in the unretouched photograph.

AJAX

TAMA-WYATT

AJAX ENGINEERING CORP., TRENTON 7, N. J.

INDUCTION MELTING FURNACE

AJAX ELECTRO METALLURGICAL CORP., and Associated Companies
AJAX ELECTROTHERMIC CORP., Ajax-Northrup High Frequency Induction Furnaces
AJAX ELECTRIC CO., The Ajax-Hultgren Electric Salt Bath Furnace

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FEF Meeting To Feature Recruiting and Training

Program of the tenth annual College-Industry Conference of the Foundry Educational Foundation has been designed to provide practical guides for successful recruiting and training of engineering talent in the foundry industry.

The meeting will be held at the Hotel Cleveland, Cleveland, March 13-14.

Panel discussions have been scheduled to cover the two most important phases of the problem of manpower for the industry—1) the development of student interest in cast metals followed by the actual engineering level foundry instruction, and 2) the recruitment and training of engineers by the foundry industry.

The importance of engineering education in cast metals from the viewpoint of the castings market will be discussed by Richard Meloy, marketing director, Gray Iron Founders' Society. Colin Carmichael, editor, *Machine Design*, will speak on the subject of teaching engineers the elements of casting design.

Speaker at the annual banquet Thursday evening will be Dr. R. C. S. Young, Atlanta, nationally known lecturer.

Program details follow:

Wednesday, Mar. 13

8:30 a.m.—Registration—Assembly Room B, Mezzanine.

9 a.m.—Trustees and Committee Meetings: Industry, University and Technical Advisory Committees.

11 a.m.—Address of Welcome: James H. Smith, Central Foundry Division, General Motors Corp., Saginaw, Mich., and president, Foundry Educational Foundation. "Marketing Aspects of Engineering Education in Cast Metals," Richard Meloy, marketing director, Gray Iron Founders' Society, Cleveland.

12 noon—Luncheon: "Teaching Engineers the Elements of Casting Design," Colin Carmichael, editor, MACHINE DESIGN.

1:30 p.m.—Panel: "Training Engineering Students in Cast Metals," G. K. Dreher, Steel Founders' Society of America, Cleveland, presiding. **University Activity:** University of Alabama—Development of Student Interest in Cast Metals, Warren C. Jeffery. University of Kentucky—Teaching Cast Metals in an Engineering Curricula, C. S. Crouse. Pennsylvania State University—Industrial Activities on the Campus, B. W. Niebel. Case Institute of Technology—Development of Scientific Literature in Cast Metals, J. F. Wallace.

3:30 p.m.—Annual Meeting: Foundry Educational Foundation.

4:15 p.m.—Trustees Meeting, 1957-58.

6 p.m.—Reception and Banquet: "Why I Am an American," Dr. R. C. S. Young, Atlanta.

Thursday, Mar. 14

9 a.m.—Recommendations of Advisory Committees.

9:30 a.m.—Panel: "The Engineering Graduate Moves into the Foundry Industry," H. F. Taylor, Massachusetts Institute of Technology, presiding. "Recruiting Engineering Graduates," H. P. Skamser, Michigan State University. "Training Young Engineers in the Foundry Industry," D. C. Ekey, Lebanon Steel Foundry, Lebanon, Pa. "Utilization of Engineers in the Foundry Industry," W. M. Dalton, Dalton Foundries Inc., Warsaw, Ind. "Growth and Development of Engineers in Industry," B. C. Yearley, National Malleable & Steel Castings Co., Cleveland.

12 noon—Luncheon.

12:45 p.m.—Summary of Conference.

Outstanding Safety Record Brings Steel Foundry Awards

Management and employees of Deemer Steel Casting Co., New Castle, Del., have been cited by Liberty Mutual Insurance Co. and the Delaware Safety Council for the company's unusually outsanding safety record.

The insurance company's award congratulated the company on its record of 407,520 man-hours without a lost-time accident and stated, "This outstanding record over a 27-month period is especially significant for this type of industry." The Delaware Safety Council award was in recognition of 328,252 man-hours of work without a lost-time accident over a two-year period.

Newlin T. Booth, company president, expressed his gratification to both the plant workers and to the safety organizations for their recognition of the plant's safety program. Deemer Steel was founded in 1910 and produces electric carbon and alloy steel castings.

At Bendix Aviation Corporation's South Bend plant, foundry sand was lodging in steel belt idlers, causing them to freeze up. Replacing just one steel idler required a two hour shutdown. Frozen idlers sometimes cut through the belt making complete belt replacement necessary.

During a single weekend Bendix replaced *all* the steel idlers with Joy Limberoller idlers. The Joy Limberoller is a single roll idler consisting of pressure-molded neoprene discs on a flexible steel cable which turns on its own axis. Only two bearings are used and these are up out of the dirt zone.

Two years later Bendix reported, *"No Limberollers have been replaced—not one belt has been torn by an idler—inspection and lubrication tours have been discontinued."*

The Limberoller idler works equally well with other difficult materials—coal or chemicals—ores or fertilizers. What's *your* materials-handling problem? For detailed booklet on Limberoller Idlers, write ***Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.*** In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

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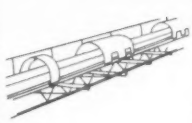
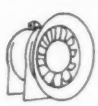
Get Bulletin 149-13

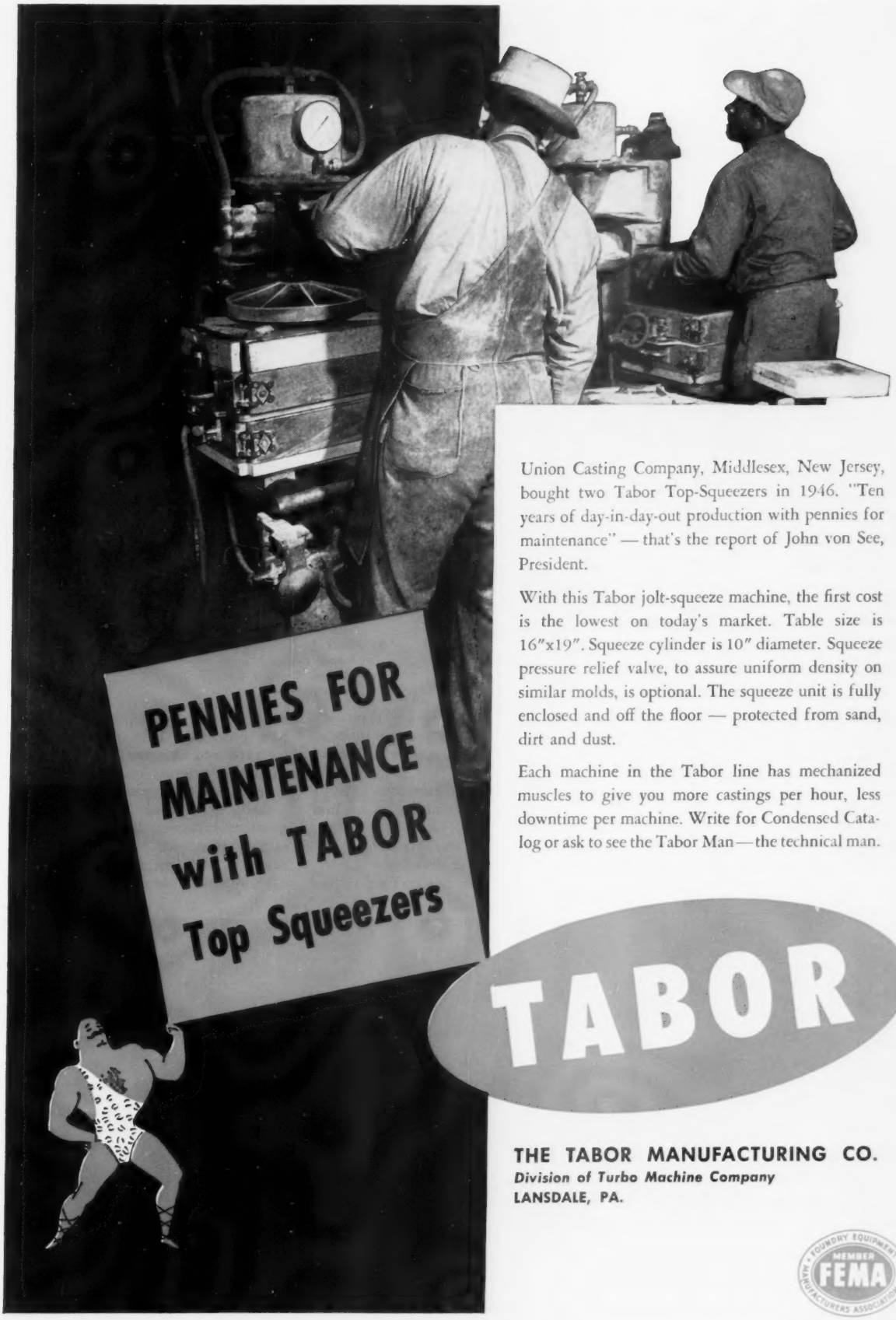
JOY...EQUIPMENT FOR ALL INDUSTRY

INDUSTRIAL COMPRESSORS


CONVEYORS

ELECTRICAL CONNECTORS


FANS AND BLOWERS



Union Casting Company, Middlesex, New Jersey, bought two Tabor Top-Squeezers in 1946. "Ten years of day-in-day-out production with pennies for maintenance" — that's the report of John von See, President.

With this Tabor jolt-squeeze machine, the first cost is the lowest on today's market. Table size is 16"x19". Squeeze cylinder is 10" diameter. Squeeze pressure relief valve, to assure uniform density on similar molds, is optional. The squeeze unit is fully enclosed and off the floor — protected from sand, dirt and dust.

Each machine in the Tabor line has mechanized muscles to give you more castings per hour, less downtime per machine. Write for Condensed Catalog or ask to see the Tabor Man—the technical man.

TABOR

THE TABOR MANUFACTURING CO.
Division of Turbo Machine Company
LANSDALE, PA.

FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION INC. MEMBER FEMA

Conversion of these parts from other forms of fabrication to shell molding saved thousands of dollars for customers—up to 80 per cent of finished-part cost

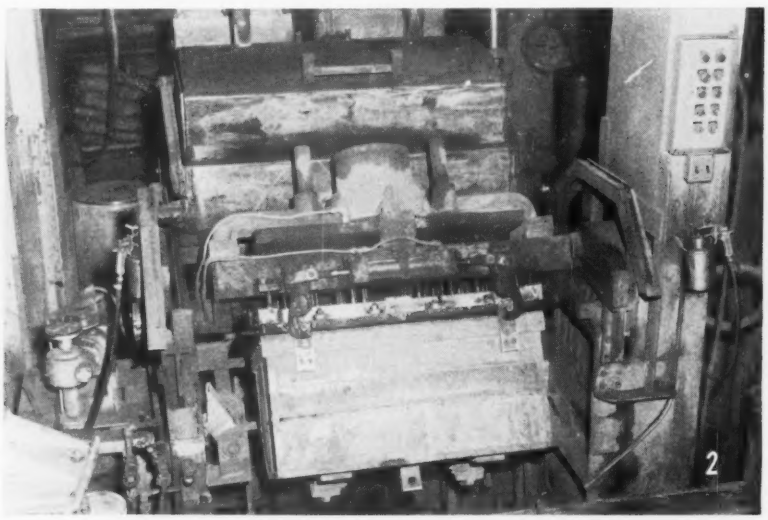
SHELL MOLDING of Steel Castings CUTS MACHINING COSTS

By JOHN F. OETTINGER
Project Engineer
Electric Steel Foundry Co.
Portland, Oreg.

SINCE the first announcement of the shell molding process in this country in 1947, it has had far-reaching effects on the foundry industry in several directions. First, it has stimulated thinking on an industry-wide basis. It has caused many foundries to improve their green sand molding practice.

It probably also has had an influence on the development of other new processes, both as competitive methods and as a result of the newly awakened interest in better ways to produce certain types of castings.

And, of course, it has had its greatest influence in its own application. Hundreds of foundries now produce shell molded castings, and all indications are that their num-



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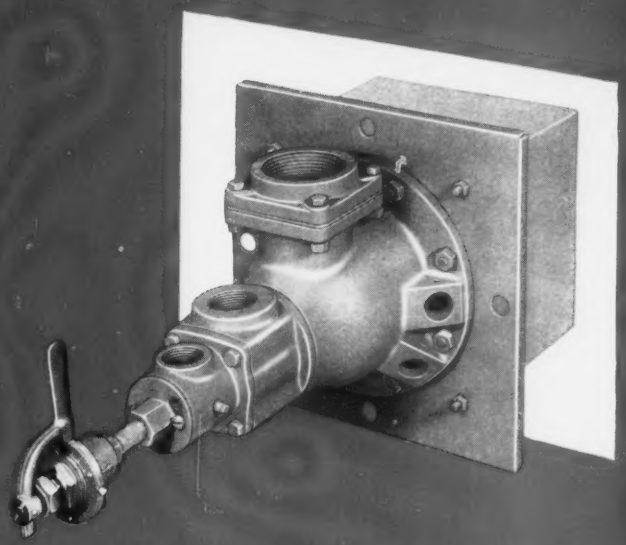

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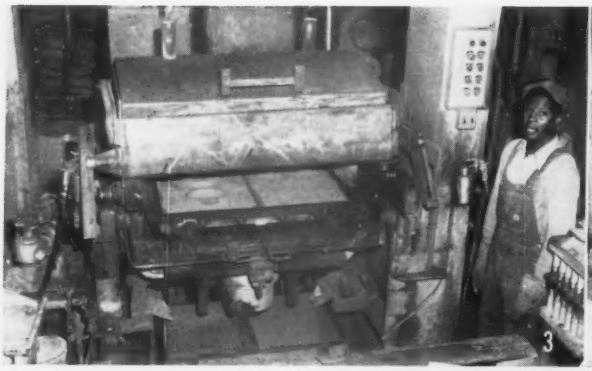

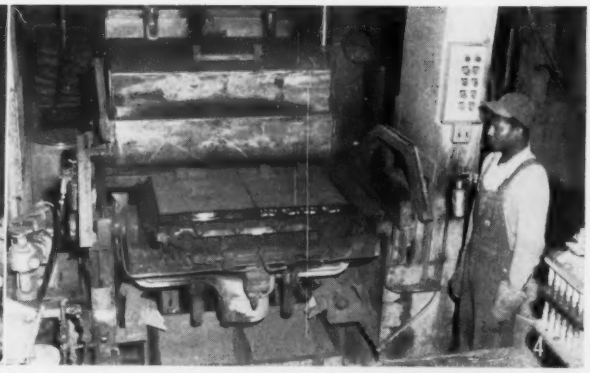

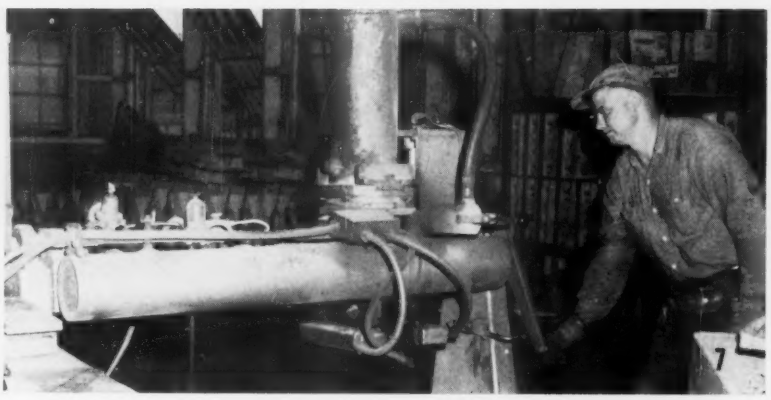

bers will continue to increase.

At Electric Steel Foundry Co., casting in shell molds has progressed far in the last few years. Since our start in 1952, we have become one of the largest producers of shell-molded steel castings in the world. Tonnage has increased 5½ times in just over a year, and we now employ more than 35 men in the shell molding department. All our common alloys and some which are not common have been poured in shell molds.

With shell molding, we can and do sell castings on which machining has been eliminated. In many instances, this elimination of difficult machining has saved customers over 80 per cent of their finished-part cost. Accompanying this article are illustrations of four castings which alone have saved customers many thousands of dollars in machining costs. Benefits of this sort help not only us and our customers, but also the entire casting industry.

The other illustrations with this article show how some of the steps in the production of shell molds and cores are performed at Electric Steel Foundry.

In Fig. 1, workers are spraying patterns with a parting solution which permits easy release of the cured shell mold from the pattern. Pattern surfaces are highly polished and machined to insure smooth casting surfaces and close tolerances.

Fig. 2 shows the pattern inverted and clamped to the dump box, which contains a sand-resin mix. It is in the process of rolling over to invest the pattern with the mix. Heat from the pattern, at about 500° F., soaks through the sand-resin mixture and melts the resin, which is a thermosetting plastic—in this instance in powder form. Sand is a washed and dried type of about AFS 120 fineness. Both silica and zircon sand are used, as required.

As the resin melts, it flows around the sand grains, bonding them together. Thickness of the shell, determined by the length of time the mix contacts the pattern, varies from perhaps 3/32 to ½ in. After the predetermined investment time, the excess mix is dumped off the

Pangborn Blast Cleaning Cabinet

blast cleans 40 to 50 tons per day at General Metals new foundry

The new $5 million foundry at General Metals Corp. in Oakland, Calif., boasts the latest, most efficient equipment for producing castings—from the molding to the finished piece.

Speeding production in the blast cleaning department is the Pangborn Monorail Cabinet shown above and two other Pangborn machines. This cabinet has handled as many as 3,500 large, individual castings a day—such miscellaneous pieces as brake drums, fuel injector pumps, valve housings, truck hubs, etc.—and cleans between 80,000 and 100,000 pounds of castings per 8-hour shift!

Thanks to Pangborn Rotoblast® cleaning action, Pangborn machines are speeding production in foundries throughout the country. That's because they clean quickly and thoroughly. They require less maintenance, less manpower. The result is *lowest cost per ton of castings cleaned.* Find out what Rotoblast can do for you. Write for Bulletin 227 to PANGBORN CORPORATION, 1400 Pangborn Blvd., Hagerstown, Md.

Pangborn blast cleans cheaper

Circle 663 on Inquiry Card—Page 225

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PRODUCTS

pattern, leaving a soft or semicured shell adhering to the pattern.

Fig. 3 shows the oven traveling over the pattern to its curing position. Heat in the oven is more than 1000° F. It hardens the shell so that it becomes rigid and waterproof.

As shown in Fig. 4, the fully cured shell is lifted away from the pattern by carefully situated strip pins. The shell follows the pattern so closely that a good deal of force is necessary to remove it. The parting solution mentioned previously helps in this operation. In Fig. 5, operators are taking the mold halves off the machine. These are fully cured and ready for coresetting and closing.

Figs. 6, 7 and 8 illustrate steps in the production of shell cores. In Fig. 6, the corebox appears between the heated platens. In Fig. 7, the operator has rolled the machine over to the investment and blow position, and in Fig. 8, the finished cores are still in the corebox, with the jaws of the machine open, ready for stripping. These particular cores eliminated a reaming and drilling job on stainless steel chain. Cast tolerances are ± 0.005 in. It should be noted that use of shell cores is not restricted to shell molds. They are of equal value in green sand molding.

After the shell cores have been set in the shell molds, an operator applies paste in carefully worked out patterns to secure the halves of each mold securely. The other half of the mold then is placed in position, and the whole mold is pressed. Heat from the mold cures the paste. Machines also are available to do the entire pasting operation mechanically.

Shell molds are easy to handle and to store. Further, they require relatively small amounts of raw materials. Because they are portable, we are permitted a choice of heats in any shop. As still a further advantage, shell molds easily are suited to simple mechanization in both mold making and pouring.

Offers New Summary of Steel Castings Specifications

A new "Summary of Steel Castings Specifications" has been prepared by the Specifications Committee and technical staff of the Steel Founders' Society of America. It includes all the specifications recommended for commercial, railroad, federal and military use, together with reference to testing methods advocated by the Committee. Copies are available free upon request to the Steel Founders' Society of America, 606 Terminal Tower, Cleveland 13, O.

Circle 665 on Inquiry Card→

AUTOMATIC SAND MIXING SYSTEM NOW MAKES LARGE VOLUME SHELL MOLDING POSSIBLE

Thanks to a Planet designed and installed sand mixing system, one of the midwest's largest foundries can now make shell molds in large quantities.

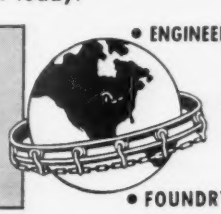
The system consists of three large bins which stand 60 feet above the floor. The largest bin holds 360 tons of one type of sand. A second bin holds 80 tons of a different sand and the third bin holds resin. The resin bin is filled by means of the receiving hopper and conveyor shown in the foreground of the picture above.

Proper proportions of sand and resin are weighed and delivered automatically to a batching hopper. From the batching hopper the materials are fed by gravity to an automatic mixer where they are thoroughly mixed for delivery to molding machines.

An overhead mold conveyor system installed by Planet in the same foundry also helps secure volume production. It moves molds from the molding machines through the pouring operation and cooling tunnel to shakeout screens.

Let Planet's experienced engineers help you solve your problems — write or call today.

PLANET CORPORATION



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• FOUNDRY HANDLING SYSTEMS

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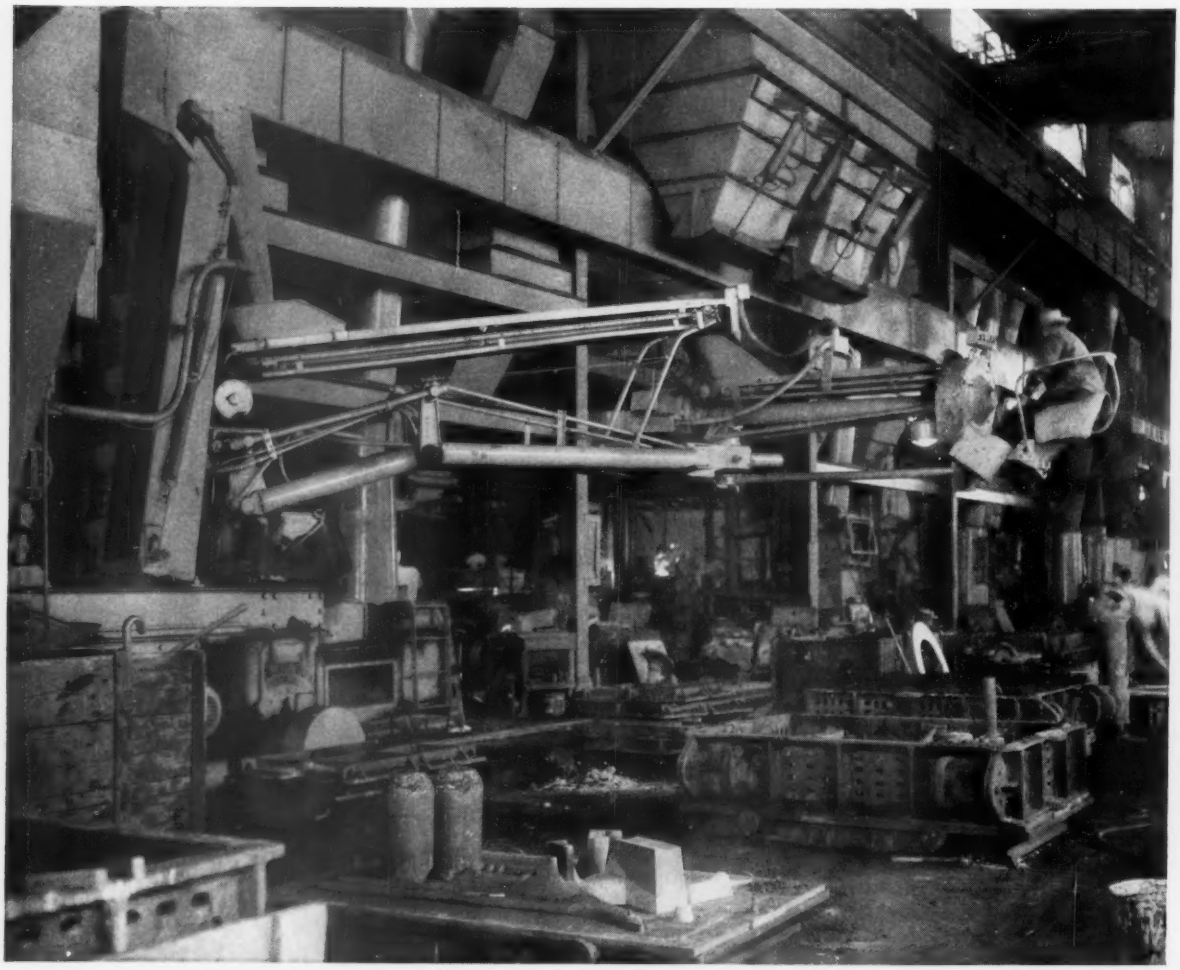
IT PAYS TO PLAN WITH PLANET

SPEEDMULLORS
SPEEDSLINGER & SANDSLINGER

...the mechanized backbone

Over 12 years of highly successful operation of two Motive Speedslingers and three Model '70' Speedmullors led directly to the choice of B & P machinery throughout the new 5 million dollar iron plant of General Metals Corporation at Oakland, California. Designed and built as one of the most modern plants of its type in the world, this new foundry depends heavily in all operations on B & P equipment.

Three Model '70A' Speedmullors prepare all of the molding sand for this new foundry, and virtually all heavy molding is done by slingers. The biggest jobs are rammed by the Motive Speed-



THIS MOTIVE SPEEDSLINGER rams all of General Metals' larger jobs. Two Motive Speedslingers in General's old plant — the mainstay of that plant since 1942 — led directly to slinger mechanization in the new plant.

ROTO-FEED PLATE FEEDERS

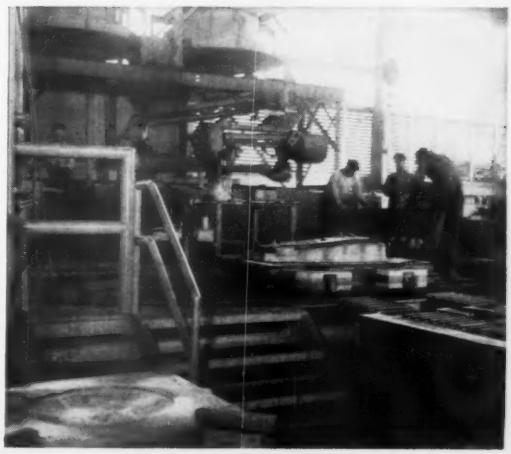
HYDRA-SLINGER ROTO-MOLD UNIT

of GENERAL METALS' new plant

slinger, while medium-size jobbing work is handled effectively on a new Hydra-Slinger Roto-Mold Unit. Many of the foundry's largest and most complex core boxes are slinger rammed on an efficient Sandslinger Unit in the core room.

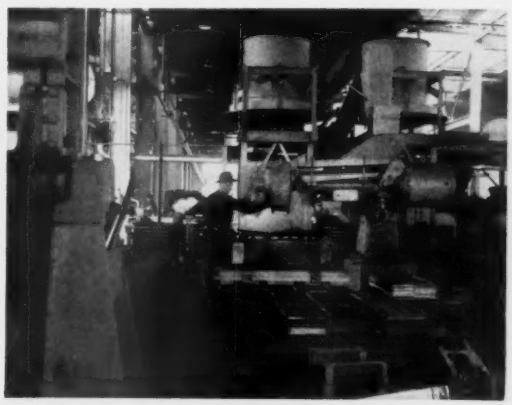
Both the Hydra-Slinger and the Sandslinger are supplied with a smooth flow of sand by B & P Roto-Feed Plate Feeders. Two eight-ton units deliver sand to the Hydra-Slinger, while two five-ton units feed core sand to the Sandslinger. Other B & P equipment is used throughout the foundry and core room.

The General Metals story is truly a story of progress thru mechanization. The B & P machinery that has contributed to this progress is fully covered in bulletins available on request. Send for copies today: Beardsley & Piper, Div. Pettibone Mulliken Corporation, 2424 North Cicero Avenue, Chicago 39, Illinois.



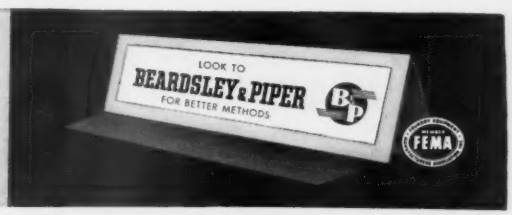
THIS B & P HYDRA-SLINGER ROTO-MOLD set-up handles a large number of General's medium size molds. The sizes range from 20"x 52" to 52"x 73". Many of the patterns are complex and require a deep draw. Accurate, uniform ramming is required, and the Hydra-Slinger provides just that with fingertip hydraulic control.

THREE MODEL '70A' SPEEDMULLORS prepare all of the molding sand for the big new 5 million dollar foundry of General Metals Corporation. Successful operation of three Model '70' Speedmullors in the old plant for over 12 years was an important factor in General's selection of Speedmullors in the new plant.



A SLINGER does a big job in General's core room, too. Here, large core boxes are slinger rammed on a multiple conveyor set-up. This slinger, like the Hydra-Slinger, is supplied with a smooth flow of sand by twin B & P Roto-Feed Units.

THE WORLD'S
FOREMOST DEVELOPER
OF FOUNDRY MACHINERY



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Man to Man

RALPH L. LEE

"I can't imagine how laboratory folks can put in their best when they know that what they do is applauded, but put away on a shelf"

Theory and Practice

I DON'T know just when or where I heard or read the story, but as I recall, it went like this:

A book salesman spotted a farmer headed his way behind his team and plough and hailed him from where he had parked alongside the fence.

"Doerfendoefer is my name, sir," the book salesman said, to start off his pitch, "and before I'm through you'll thank your lucky stars you met me, for here, sir, between these two covers, you will find all of the latest, revolutionary and profit tripling methods and procedures of farming, developed and proved by the ten leading agricultural colleges of the nation working in co-operation with the Department of Agriculture and countless internationally known authorities."

The farmer never said a word. Catching his breath, the salesman spewed on, "Confidentially, sir, I have time to call on only a few of the leading farmers in this county, so—!" Opening his order book and unscrewing the cap from his fountain pen, he offered them to the farmer.

"Nope," said the farmer.

"Why? In the name of Heaven, sir," the salesman insisted, "this book will pay for itself a hundred times over during this coming season."

Shaking a final "No" with his head, the farmer said, "Ain't farmin' now half as good as I already know how to; so I'll be ding-danged if I clutter up my head with a lot of other stuff I know dinged well I won't get around to."

Different Viewpoints—Here lately, as always, I call on every foundry I can during my many trips out of town. And as usual (it's the nature of the beast) I'm all hopped up over a number of my pet foundry subjects, including one now closest to my heart, which happens to be the difference between sand practice out on the floor, bench or line and the theories of the boys in sand labs.

As I have hinted a number of times here, I have been having a holy circus trying to develop sort of a Goldberg arrangement for accurately determining the tensile strength of green sand as it actually is in molds. Like most inventors, up to their hips in tinkering, I have those spells when I don't know whether I'm going or coming.

So in a little portable carrying case I've been taking the tensile tester along with me on some of my trips to show it off a bit to a few of my hosts, hoping, of course, to get their first impressions of my baby. More particularly, however, I'd like to get their feeling about the need for greater accuracy in sand characteristics determinations — or rather for sand tests which more nearly represent actual conditions inside the molds.

In every case so far, my hosts have been very much interested in what I've been up to. I have a feeling that it's the novelty of my approach to the subject which gives them a bigger bang than its possible usefulness. We never have time to go far enough with actual experiments to come to any definite conclusions, although they encourage my efforts.

"I've taken the tensile tester along—"

One of These Days—And in every case where I've shown my toy, the head man has said some nice things about my foundry fanaticism, together with a word of encouragement about my present project. But, without exception, every one of these head men, while not in these exact words, has said in effect, "Look, Doc, we know that our sand practices are a far cry from what they should and can be. But we're hemmed in. We need more capacity. Right now we could use two more mixers, but we don't have enough room. Sand gets too hot, but we haven't the money to do what we should do and start from scratch. Now, one of these days, Doc—"

I come away from these man-to-man chats with sort of a chuckle, not at them, but at myself. "Here I am," I say to myself (talk quite a lot to myself here lately. Better watch it, but as I was saying—), "here I am, working like a little old beaver, trying to develop a sand micrometer which will split thousandths while the boys down on the line are ramming their merry way, day in and day out, with dressmaker's cloth-tape measures, so to speak."

The old five-digit hand squeeze and roll tester, supplemented with statistics on runouts, swells, scabs, rattails and scrap of one kind and another is doing the job, and producing a lot of good castings too.

Sand mixer men, those geniuses, literally are performing miracles on the basis of experience, feel and com-

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NEW! AIR-POWERED! LIGHT-WEIGHT!

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AIRETOOL . . . pioneer in air motor design and development introduces these new, lightweight, portable tools for greater efficiency and lower operating cost on grinding, buffing and polishing operations.

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For the complete story on how Airetool can speed up your grinding operations and reduce costs, send for Bulletin No. 61.

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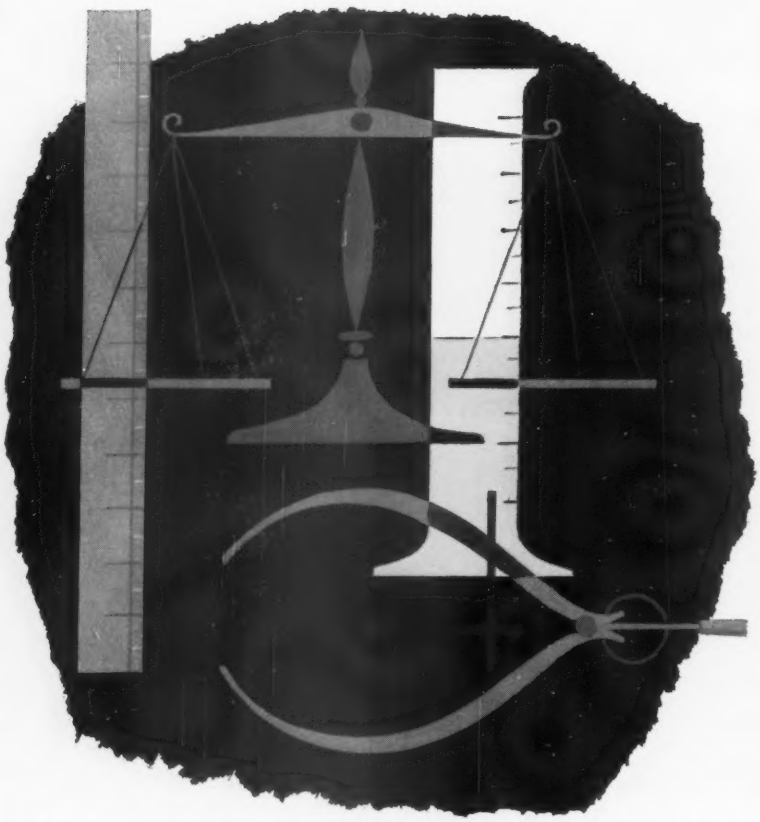

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economy is not measured by price alone!

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How long will an abrasive last? How long before it breaks down into fines and becomes inefficient?

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To sum it all up — the economy of using any abrasive can be measured by the **cost per ton of metal cleaned!**

On every count, Malleabrasive has proved its superiority over the years in hundreds of plants.

If you want to improve the economy of your blast cleaning operations — check Malleabrasive.

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plaints. They have to make allowances for shakeout sand almost too hot to touch, for long, dehydrating trips on conveyors to that last station 'way out yonder, for changes in production schedules, surges of core sand inclusions, fines, changes in new sand sources and additives. Well, sir, it truly is amazing how well we do manage right in the middle of this crowd of ever-changing variables.

Without viewing with alarm or clucking the old tongue, and with profound respect for all who play a part in the foundry process, I'm interested in the gulf which seems to separate the viewpoints of the production boys from the lab boys. Being sort of an amateur hybrid or combination slide-rule slipper and sand rammer, I suspect that this gap looks wider to me than it would if I were a pure specimen of either.

But, whether it's narrow or wide, I don't think this gulf, if it really exists, is doing us any good. I can't imagine how researchers or laboratory folks can keep on putting in their best licks when they know for a fact that the dope they've already dug up and proved beyond all question of doubt is applauded and paid for, but stowed away on the shelf.

Too Wide a Gap—And in spite of every assurance that their berths are safe and that their activities will continue with the blessing and financial support of the powers that be, if the gap between them and the boys out in the shop gets too wide, the technical boys are likely to go hog-wild indulging themselves with theoretical doodlings.

In the meantime, the boys out in the shop are likely to struggle along in deep trouble with tape measures when micrometers from the lab cupboard would be much more in order.

I guess what I'm trying to say is that maybe it might be a good idea if every once in a while we took an inventory of the data piling up on our technical data shelves and checked it against that which has left the shelves and been put into practice.

If the usage turns out to be piddling in relation to cost of collecting the library, maybe we'd better be more careful selecting what we think should be researched.

Maybe this will work itself out automatically if the theory boys get more practice and the practical boys get more theory. In any event, it will do 'em both good to get chummier. When you get right down to it, there is no line which separates theory from practice. If a theory can't stand the test of practice, it's not theory. It's an hallucination.

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Towmotor Mass-Handling – moving more units faster, at lower cost – can well be the investment that promises greatest improvement in your future profits, as you face continually rising costs and a shrinking manpower pool.

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Have you seen the new Towmotor lift trucks lately? They offer a wealth of "first-time" features such as:

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- Maximum free lift that tops all
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- Power steering that saves 80% of operator's efforts

Get Bulletin SP-23 on new Towmotor lift trucks from Towmotor Corporation, Cleveland 10, Ohio.

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THE ONE-MAN-GANG

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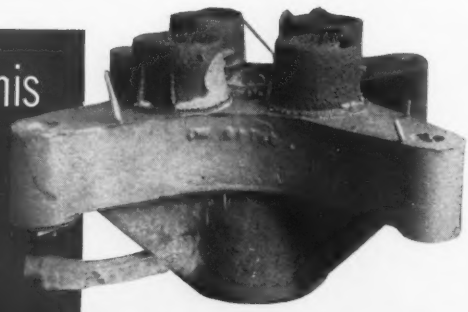

Weight of Casting.....2772 lbs.
Weight of Residual Risers.....362 lbs.
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Feedex sleeves....9" high x 9" I.D. x 11" O.D.
Casting yield by conventional methods 52%

...with those made in your foundry.

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How Your Company Can Keep Key Personnel

Keep the Good Ones—It's As Easy as It Is Smart

By Ernest W. Fair

REPLACEMENT of a key man never is easy. It may take a lot of time and effort, and the chances are that a company may be forced to make replacement a number of times before obtaining as good an individual as the one it has lost. It therefore is obvious that it's far better to keep key personnel than to replace them again and again. Doing so is, however, a task which requires planning and foresight.

Many executives have worked hard to accomplish this end and the efforts they have expended have brought results. The methods they have used are worthy of the consideration of others.

It must be remembered that key personnel are different from the average employee. In time, management always develops definite techniques in handling employees as a group. These are devised from experience and shaped and reshaped until they are highly effective. Applying them to key personnel is, however, often a mistake.

These people usually have more intelligence, more ambition, wider interests and different reactions to given situations, and they must be handled differently. They are, in short, analogous to executive personnel and must be so handled.

A Measure of Authority—Nothing will hold a man to a given job better (other than wages) than a measure of authority or supervision over other personnel. For a key employee, this authority is a first step upward in his ambitions within the organization. He will stop to think before changing jobs when he must forfeit such standing with the firm for which he is now working.

Opportunity—Opportunities must be equal to hold key personnel. There are always the individuals who have ambition (the reason why they are in the particular jobs they hold) and are looking for opportunity for advancement. Time and again we have talked with such men and women in many lines of industry. Invariably when the subject of a possible job shift to some other firm came up, they began by asking questions about the opportunities in the other firm.

Many shop managers make the un-

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Replacing sand transmission piping lines is quicker, easier with non-welded installations of WELD + ENDS with clamping screws. No threading, no special make-ready is necessary. Cut the pipe—slip the WELD+ENDS on—tighten the clamping screws . . . That's all there is to it.

Non-welded WELD + ENDS are better than flanges, especially where there is frequent replacing of pipe. They can be used over and over again with only the clamping screws requiring replacement.

Where pipeline vibration is severe, clamping screws may be equipped with Nylok lock nuts and Shakeproof washers as shown in the illustration.

Reusable non-welded installations of WELD + ENDS offer continuous savings in down time and repair costs. Write today for further information—also inquire about Plidcowear erosion-resistant pipe. Address Dept. E26

THE PIPE LINE DEVELOPMENT CO.
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fortunate mistake of failing to keep such key personnel aware of the opportunities toward which they can work. Too often it is taken for granted that the key employee knows about them. Even if he does, there is a constant need for periodic reminders.

The Income Question—Net income positions should not be too far apart from those offered by competing firms. Many a survey has shown that given firms are holding key personnel despite offers of better salaries elsewhere—but the differential generally is slight, with compensating advantages on the present job. Where such differences are great, however, this factor is the major cause of shifts by key personnel from one firm to another in almost every industry.

Recognition—Recognition of extra effort by key personnel always is of paramount importance to hold a man on his job. These men usually are placed in such key jobs because they respond to incentives. But when they put out effort beyond that required to do their job and no recognition is forthcoming, they develop the I'm-not-appreciated-here frame of mind. They then may be ready to jump to another company if opportunity is equal and they believe such recognition would be forthcoming there.

Living and Working Conditions—Desirable working and living surroundings are a further consideration. One of the factors most frequently mentioned in employment advertising is the living advantages in the area of the firm or the working conditions within the organization. Experience has shown these firms that such attractions are effective in convincing desirable employees to change jobs.

Pleasant working conditions always help to breed job satisfaction. A periodic survey of employees to discover unsatisfactory conditions has been adopted as standard policy by many large manufacturers to safeguard against such conditions arising without knowledge of management.

It often is difficult to do anything about living conditions in one's community, but their importance in holding key personnel brings up the need for company executives to take an active part in promoting improvement of the community. Such activities pay for many reasons, one of the most important of which is that key personnel then are easier to hold.

The Right Job—Be certain that employees are working at jobs they

Not a speck of slag or metal sticks to linings of IRONTON BERLITE

FILLED 974 TIMES,

a 1200-pound ladle handled 670 tons of metal before the lining of *IRONTON* BERLITE was replaced. The iron was poured at 2850° F. in a foundry making automotive housings.

Clean Ladles

are a profit factor . . . protecting quality of castings, reducing scrap, saving labor. It pays to use *IRONTON* BERLITE in hand, bull and mixing ladles . . . because BERLITE does not shrink or expand, resists slag and metal erosion, has a higher P.C.E. than any fire clay material. Ask an Ironton foundry engineer how you can put multi-purpose BERLITE to work throughout your foundry. Call or write today.

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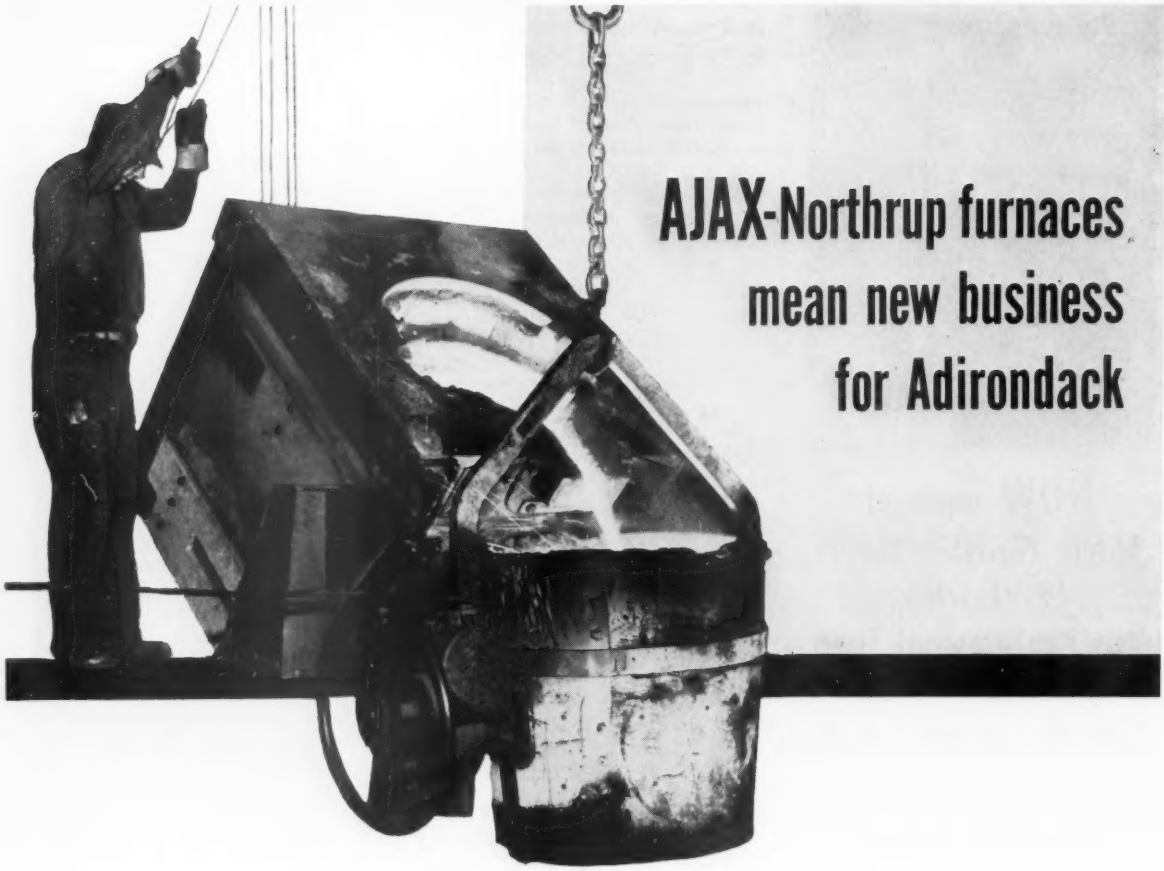


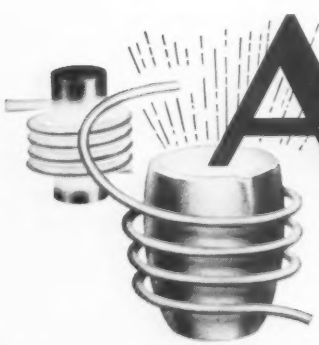
AJAX-Northrup furnaces mean new business for Adirondack

Three new Ajax-Northrup furnaces are *more* than paying their way at Adirondack Foundries and Steel Company, Watervliet, New York. Less than six months after installation, they opened a new half million dollar a year market, with promise of even doubling *that*.

Adirondack could easily handle the largest jobs in arc furnace steel, but not the low carbon, high alloy types. That's why The Company turned to Ajax-Northrup induction furnaces . . . the one efficient method of accurately melting these metals. Three Ajax-Northrup high-frequency induction furnaces with capacities of 2,000 lbs., 1,000 lbs., and 300 lbs. powered by a single 350KW generator met the need exactly.

From the start, Adirondack enjoyed fast melting under close control, low alloy losses, and amazing economy . . . economy that permitted the foundry to take, profitably, more than half a million dollars new business. The advantages of Ajax-Northrup induction melting equipment can be realized in your foundry, too, whether ferrous, non-ferrous, or both. Write Ajax Electrothermic Corp., Trenton 5, New Jersey, for additional details in Bulletin 27-B.

Associated Companies: Ajax Electric Company — Ajax Engineering Corporation



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MODEL A-27

You can count on CMD for the finest in core handling and allied foundry equipment. Our core trucks, barrows and racks are built to handle and transfer cores safely and easily. The secret is CMD's exclusive resiliency—a resiliency caused by coil, leaf spring and pneumatic cushioning—the smoothest core ride in the industry.

Look to CMD for superior quality, longer life, less maintenance in foundry products.

- CORE BARROWS
- CORE TRUCKS
- RESILIENT CORE RACKS
- WOODEN FLASKS
- WOODEN BOTTOM BOARDS
- BAG HOLDING TRUCKS
- CHIPPING HAMMERS
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- SLIP JACKETS

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like. Keep a check on the interests of such individuals. Where a key employee in a given spot is working toward another kind of job as a goal, and we want to hold onto that individual, it is wise to give him the opportunity he seeks within the organization if it is possible.

Not every employee is satisfied with what he is doing today, no matter how good the job may seem to management. It is foolish to lose a valuable individual if an opportunity for the work he desires exists in the organization. Keeping posted on such individuals is a responsibility not only of the departmental supervisor or foreman, but of foundry management as well.

Quality of Supervision—Bad supervision can lose key employees in any business. It pays to survey supervisors and foremen regularly. Where they have developed bad habits or methods of handling the men and women under them, they can be a major cause of loss of key personnel in any foundry.

In such circumstances, desirable personnel not only will snap at job opportunities elsewhere, but will look for them. No one likes to work under an individual who makes the job miserable, no matter what financial rewards are offered.

Many firms have found that it pays to sell the company as a desirable firm for which to work to the wife as well as to her husband. Small house organs offer an excellent medium for doing this job and can be produced inexpensively—even on an office duplicating machine. Company parties, dances, picnics, etc., also are used for this purpose by many firms. Some executives actually make it a point to call on wives.

Pride in the Company—Instilling pride in the employee's work, the product he helps to make and the firm itself are important in holding key personnel. Many companies spend a lot of money selling customers on all these factors, yet neglect to sell employees on them, too. Pride in the job and the company are essential to job satisfaction, particularly with key personnel. It takes powerful persuasion to get such a key individual to change jobs when he not only is happy in his present position, but also is proud of being an employee of the firm.

All the foregoing points are of importance in holding key personnel. Most important of all, however, is that management should take steps to work at holding the good will of these individuals, rather than to assume as a matter of course that the employee will not leave.

HERE'S PROOF!

IRONTON BERLITE STANDS MORE HEAT *than any fire clay brick you'll ever use!*

In the tap hole area of a malleable iron furnace with metal tapped at 2840° F, *IRONTON* BERLITE mortar is ***more refractory than super-duty brick.*** When the furnace was shut down for repairs after running 16 hour heats, pouring 400 tons a day for weeks, we took the photograph above. The joints of *IRONTON* BERLITE stand out like a backbone along the brick sidewall.

TOUGHEST MORTAR YET

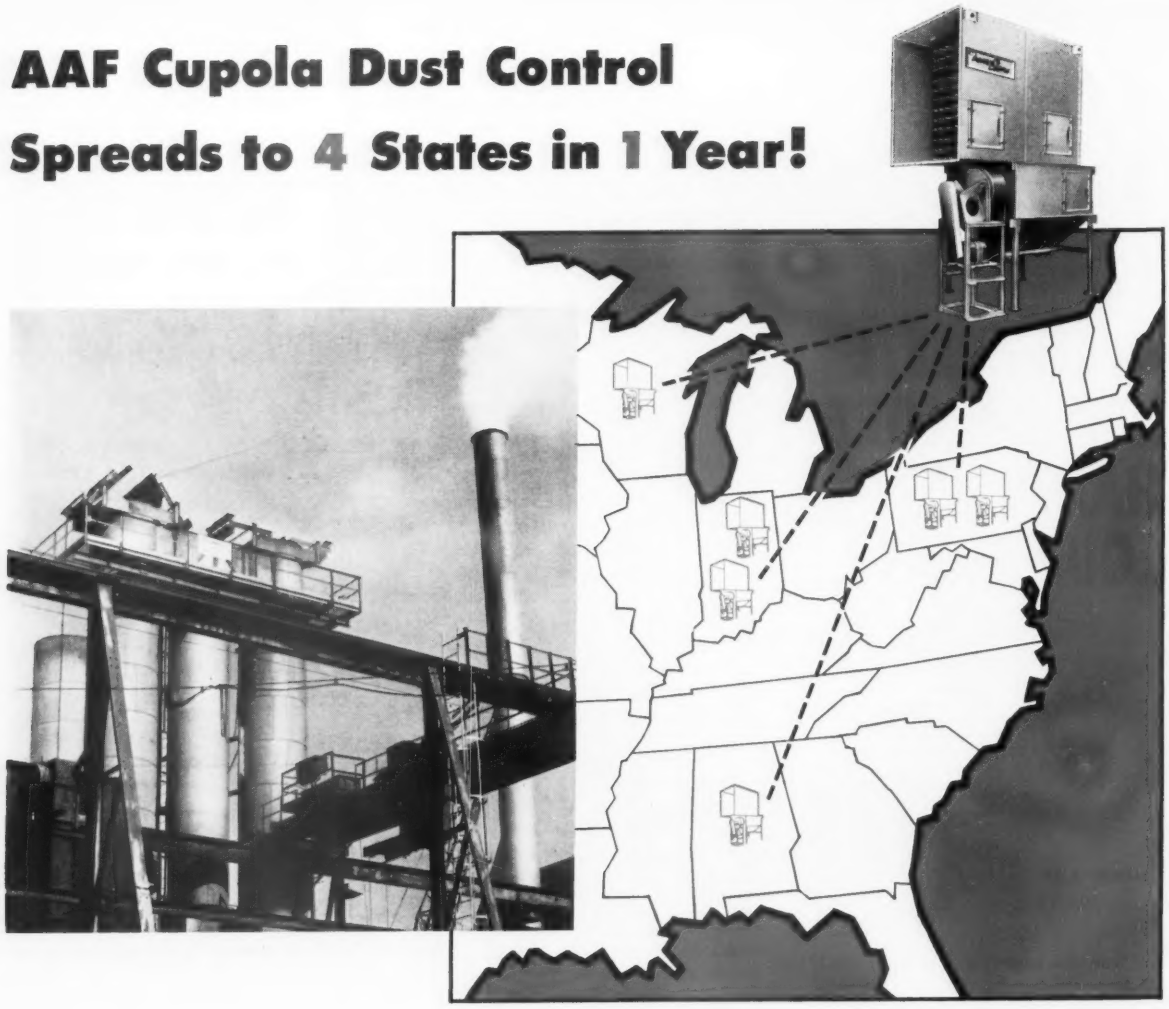
IRONTON BERLITE will outlast any fire clay material. For an actual photograph and service report on BERLITE in a really hot installation, write to our Special Products Division.

You can have on-the-spot consultation without obligation. Call or write Ironton to arrange for a visit by our experienced foundry engineers.

THE IRONTON FIRE BRICK COMPANY
SINCE 1917 IRONTON, OHIO
1349 Ashrabula Street
OUR 40th YEAR OF Reliable Refractories
Write for name of nearest representative, or telephone Ironton 109

Circle 675 on Inquiry Card—Page 225

AAF Cupola Dust Control Spreads to 4 States in 1 Year!



AMERclone collector selected by six foundries

In just one short year, the AAF AMERclone has become an accepted solution for control of cupola dust. The reasons: reasonable cost, better collection on fine particles and elimination of corrosion.

AMERclone *gets* the particles that cinder catchers *miss*—the *small* particles that create *big* problems. One AMERclone system handles two cupolas alternately . . . permits full-time use of equipment. Dust and cinders are collected dry, which simplifies disposal and prevents corrosion of collection system.

For complete product information, call your nearest American Air Filter representative or write direct for AMERclone Cupola Bulletin No. 292.

AAF herman nelson

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BETTER AIR IS OUR BUSINESS

AAF Electric Furnace Hoods

AAF Type K Exhauster

Obituary

J. H. REDHEAD, 76, former president, Lake City Malleable Co., Cleveland, Lake City Malleable Inc., Ashtabula, Ohio, and Columbus Malleable Iron Co., Columbus, Ohio, died Jan. 22 in Ft. Lauderdale, Fla. He entered the foundry industry in 1899 with National Malleable & Steel

J. H. REDHEAD

Castings Co., Cleveland, leaving there in 1925 to become vice president and general manager of Columbus Malleable. Mr. Redhead organized Lake City Malleable Co. in 1928 and Lake City Malleable Inc. after the war. He retired from these companies in 1953.

Robert D. Walter, 51, chief chemist, Archer-Daniels-Midland Co., Cleveland, died Jan. 29. Mr. Walter attended Western Reserve University and joined the company 15 years ago. Active in the Northeastern Chapter of the AFS, he was a former secretary and director of that organization.

Charles N. Phillips, 74, until retirement 3 years ago secretary-general manager of the former Phillips Foundry Co., now Pacific Southern Foundries Inc., Bakersfield, Calif., died Jan. 25.

David E. Gilbert, 70, owner of Arrow Brass Foundry, Los Angeles, died Jan. 17. He founded the company in 1924.

John G. Niederer, 101, former designer and supervisor of the casting of bronze architectural work in United States and Canada, died Jan. 12 in San Pedro, Calif. A native of New York, early associations included Pennsylvania Brass & Bronze Co., Philadelphia, Gorham Mfg. Co., Providence, R. I., Klaber & Co., Carlstadt, N. J., and A. H. Tallman Bronze Co. Ltd., Hamilton, Ont.

Charles C. Kawin, 79, founder and chairman of Charles C. Kawin Co., Chicago, chemical and metallurgical laboratory, died Jan. 26. Before founding his own company he worked in the laboratory of Griffin Wheel Co., Chicago. Mr. Kawin was one of the pioneers in the establishment of operational controls in the foundry industry. For many years he was treasurer of the Chicago Chapter, AFS, and the predecessor Chicago Foundrymen's Club.

Harry E. Ladwig, 61, from 1944 to 1955 works manager of the West Allis foundries and pattern shops, Allis-Chalmers Mfg. Co., Milwaukee, died Jan. 21. Since retirement two years ago, Mr. Ladwig was foundry consultant for the company. Starting with Allis-Chalmers at the age of 14, in addition to work in the

HARRY E. LADWIG

foundry he also served in the pattern shop, shipping room, machine shops and office. A past president of the National Foundry Association, he was also a former president of the Wisconsin Chapter of the AFS.

George E. Long, 70, retired chairman of the board and former president, Koehring Co., Milwaukee, died Jan. 21. He served as chairman from 1951 until his retirement this year. Mr. Long joined the company in 1928, served as controller, treasurer, a director, and was president-general manager from 1940 to 1952.

ONE REFRACTORY does 7 jobs to SIMPLIFY your foundry routine. Add the necessary water to **Ironton BERLITE** and put it to work 7 ways:

RAMMED LINING for bull, mixing ladles.
MUD LINING for hand and bull ladles.
RAMMING MIX for tap & slag holes, spouts.
MORTAR for brick-lined ladles.
MORTAR for cupola block.
PATCHING MATERIAL for all ladles.
WASH COATING for ladles & cupola spouts.

SAVE ON LONGER SERVICE

Slag and metal do not stick to **Ironton BERLITE** . . . so linings are not destroyed in cleaning ladles. **MORE REFRACTORY** than any fire clay brick, **Ironton BERLITE** does not melt or slag out. Since **BERLITE** meets every refractory need, your inventory and delivery worries are over. You'll eliminate refractory repairs, too. **BERLITE** is stored dry; you should never have any waste. Day-to-day service tests prove these facts.

We will send you enough **Ironton BERLITE** to test in your shop under your conditions. We ask only that you pay the freight. If you need help, Ironton engineers are always available to work with your men and show them exactly how to use **BERLITE.** Write or phone us **today.**

THE IRONTON FIRE BRICK COMPANY
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1351 Ashtabula Street
OUR 40th YEAR OF Reliable Refractories
Write for name of nearest representative, or telephone Ironton 109

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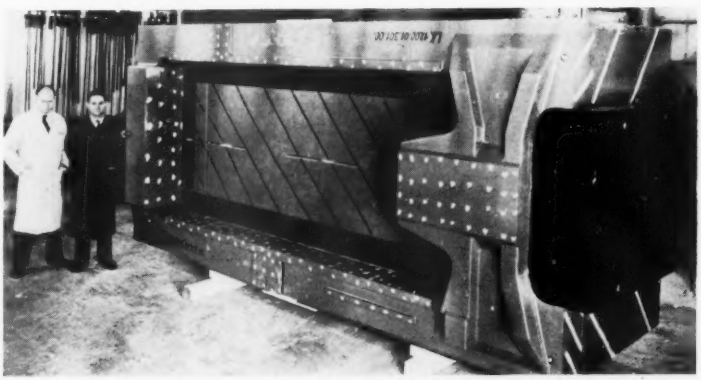
News Views

IN APPRECIATION: Plaque at right was given to Walter L. Seelbach, president, Superior Foundry Inc., Cleveland, by company employees in appreciation of his ten years of leadership. Left to right are Lloyd Leeseberg, assistant general manager, Alexander D. Barczak, plant manager, and Mr. Seelbach. W. R. Metzger, personnel manager, made the original presentation of the plaque on behalf of all the employees of the company.

HEAP BIG CHIEF: A prize-winning floral float in the recent Pasadena Tournament of Roses parade featured as its main theme a 14-ft-high replica of Chief Keokuk, a symbol used in the advertising of the Keokuk Electro-Metals Co., Keokuk, Iowa. Drawings of the famous chief have represented Keokuk products for many years. The float was sponsored in the parade by a group of Keokuk industries.

NEWLY ELECTED: Newly elected officers of the Electric Overhead Crane Institute Inc., are, front row, left to right: Vice president, F. M. Blum, Industrial Division, Harnischfeger Corp., Milwaukee; president, H. T. Florence, Cleveland Crane & Engineering Co., Cleveland; director, A. R. Walkley, Manning, Maxwell & Moore Inc., Muskegon, Mich. Back row, left to right: Director, W. H. Morgan, Morgan Engineering Co., Alliance, O.; executive secretary and treasurer, J. H. Peritz, and director, W. W. Beattie, Northern Engineering Works, Detroit.



GIANT PATTERN: Giant pattern is first step in production of a 1200-ton aluminum die casting machine in Germany by Maschinenfabrik Weingarten A/G for Lester-Phoenix Inc., Cleveland. The frame to be made from the pattern will be about 6 ft wide x 6½ ft high x 15 ft long and will weigh 68,000 lb as-cast. The metal being cast is a nickel-chromium-molybdenum steel alloy. The German manufacturer is licensed to build and sell Lester die casting equipment in Europe.

Why Graphite-base Refractories?

...SEND FOR THIS NEW 24-PAGE BOOKLET

Graphites are not new in metal melting uses—but the perfection of ***HELSPOT***, in plastic and brick form, has been accomplished by the MEXICO REFRACTORIES COMPANY. MEX-R-CO products are performance-proven in some of the largest steel mills and foundries in this hemisphere.

HELSPOT has proved its ability in higher purity of metal. Many letters from steel men and foundry operators testify to that fact. No other Graphite-base refractory has ever received the acclaim which has been accorded ***HELSPOT***.

HELSPOT in composition is a mixture of high grade fire clay, graphite bonded with a unique and special ingredient.

It will pay you dividends in time, money, and cleaner metal to investigate and use ***HELSPOT*** in your operations.

Send for the new booklet "Graphite-base Refractories". It illustrates many of the recommended applications in steel mills and foundries.

MEX-R-CO

122

MEXICO REFRACTORIES COMPANY

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NILES FIRE BRICK DIV.—Niles, Ohio • NATIONAL REFRACTORIES DIV.—Philadelphia, Pa. • BIG SAVAGE REFRACTORIES DIV.—Frostburg, Md.

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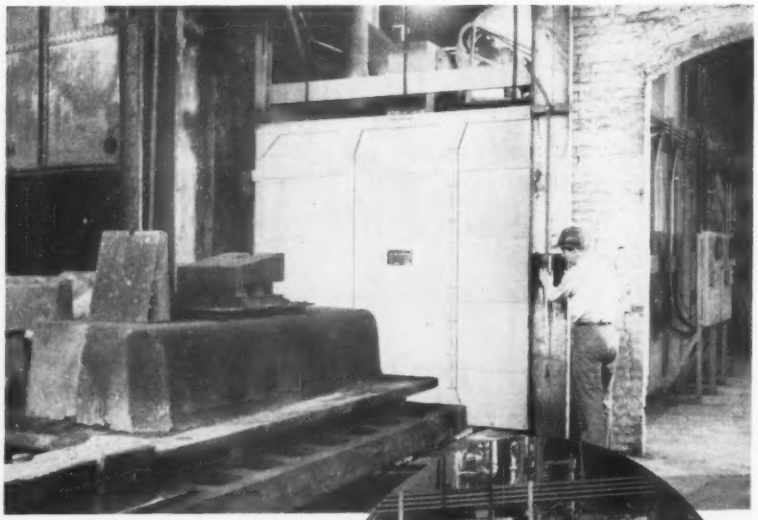
here's another

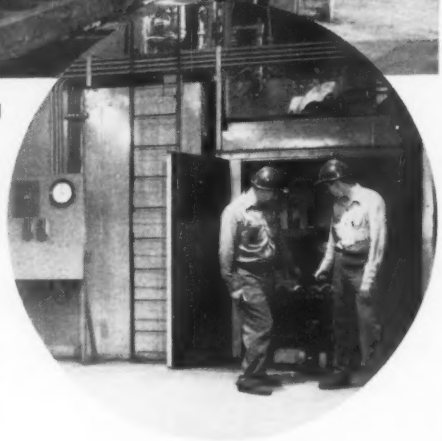
carl mayer installation...

Cutting Costs for its Owner



CAR TYPE CORE AND MOLD OVEN

Above—A difficult engineering and installation problem solved by Carl Mayer because the oven filled this space completely. This modern oven, with patented down draft heating system and motor operated lift door, replaced an obsolete brick oven.



RACK TYPE CORE OVEN

Right—Installed at rear of mold oven to form an efficient, flexible combination. Miscellaneous cores are uniformly baked with modern, automatic controls. Operation is efficient and economical.

Carl Mayer's outstanding engineering and design features sold the steel mill where these ovens are now in operation. They incorporate the exclusive Carl Mayer recirculating heating system and special triple slotted panel construction.

Heat loss is reduced up to 1/3, and fuel savings up to 50% over old conventional methods are possible. Temperature uniformity is guaranteed.

Consult Carl Mayer now for any type foundry oven or furnace, large or small, and for any purpose. Write for Bulletin 53-CM.

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OTHER PRODUCTS: Heat Treating Ovens and Furnaces • Rod Bakers • Welding Rod Ovens • Paint and Ceramic Drying Ovens • Special Processing Equipment and Accessories

Meditations of a Sandman

By HAROLD E. HENDERSON
H. C. Macaulay Foundry Co.
Berkeley, Calif.

"Compromise"

SAND technicians or consultants—call them what you will—have at least one thing in common which sets them apart as a special breed—namely, an unfailing desire to help each other, to exchange information freely in the hope that the casting industry may attain higher levels of performance and excellence. Can you blame them if they purr contentedly when a few crumbs from the glory table are brushed into their dishes?

These gentlemen have permitted sandrats like myself to sit in on their conferences and to absorb as many of their words of wisdom as we were mentally capable of. They have at all times been gracious and generous in dispensing advice and suggestions to us, and, I might add, they have exercised admirable patience in translating laboratory lingo into the vernacular of the foundry.

Your correspondent (who hardly could be considered humble) has, during the past 15 years, repeatedly urged the sand-conscious foundrymen of his immediate area to get together in frequent discussions of their mutual problems. It was assumed at the outset that we all suffered some degree of sand failure and that by engaging in free and open discussion, solutions to our problems might be found. Subsequent experience has confirmed the wisdom of that assumption.

We certainly were not of one tribe or persuasion. There were iron, steel, and nonferrous men, all engaged in some phase of foundry sand practice. They exchanged notes and arguments and always profited in the exchange. We soon developed a tremendous respect for each other, even though we seldom saw eye to eye on any given problem. It was this difference in viewpoint that stimulated analytical thougtht.

All the Answers—There were those among us who had positive answers

OPEN LETTER TO FOUNDRYMEN

Famous Cornell Cupola Flux improves the quality of your castings. You get cleaner metal and better slag control.

Famous Cornell Cupola Flux is a scientifically prepared mixture of high grade fluorspar and many other materials which cause a chemical reaction in molten iron. This reaction purifies the iron so that all the slag floats off.

P. S. Famous Cornell Cupola Flux costs only a few cents per ton of metal!

Be sure to try Famous Cornell Brass or Aluminum Flux send for Bulletin 46-A

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for every question, and there were others who made no pretense of having any answers, but seemingly were content to ask many, many questions.

Between these extremes was the fellow who had tried and failed many times, but who kept on trying and finally had his patience rewarded.

Constructive yet cautious criticism was the order of the day, and as our general practice improved, the word spread that our efforts were paying off. A considerable amount of sand information was collected and catalogued, all of which was available to any foundryman who felt that it might contain something of value for him.

One dominant fact became increasingly clear to us as we approached the middle stage of our deliberations—namely, the truth of Harry Dietert's oft repeated assertion, "A sand-mix which works well in one shop may not necessarily succeed in another."

This point was our first stumbling block. Why should a formula which had proved reliable in the Smith Foundry fail utterly when Jones used it? Both men supposedly were doing the same thing. Materials had been carefully measured, the mixing carefully timed, and moisture held to the desired figures. Yet sand behavior and casting finish were considerably at odds.

It was at this point that we began to question our respective methods and materials. Although we had little knowledge of the scientific approach, we leaned heavily on those who did. With their help and a modicum of reading in current technical articles, we managed to absorb and exercise a little of the academic technique of our more learned brethren.

No Time To Experiment—Our immediate problems were pressing and did not permit us to indulge too much in theorizing or in time-consuming research projects. We were fighting scab, buckle and blow, the three leading offenders in the long list of "ills that sand is heir to." There was no time for laboratory experiments (especially when most of us were without laboratories!).

Each day we suffered a mark-up in the price of ignorance! Our decisions had to emanate from empirical experience, anybody's, but immediately! Perhaps this hasty action was unwise, but desperate men are apt to resort to desperate measures! When a man's bread and butter depends on the solution of a problem, he has no alternative except failure. I am happy to report that we did not fail!

The most interesting, informative, and profitable phase of the entire experience was, however, the respect we gained for the word "compromise." For example, Joe might be completely discouraged because of an epidemic of scab or buckle in his little foundry. Bill, a competitor, who produced a very similar line of work, had experienced all of the trouble that Joe complained of and had solved the problem quite satisfactorily. He promptly proceeded to offer a detailed description of the *modus operandi* for Joe's benefit.

But, as usually is the case, Joe didn't listen too carefully, or perhaps Bill's story lacked a few of the important details. At any rate, Joe's trouble continued unabated, and he was sure that he had been tricked! Bill was adamant in his insistence on the complete truth of his story.

The Picture Was Different—Joe finally visited Bill's foundry and clearly observed what Bill was doing. The picture seemed quite different then. They were using different sands and different clays, and there were other discrepancies which

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Standard For The Industry
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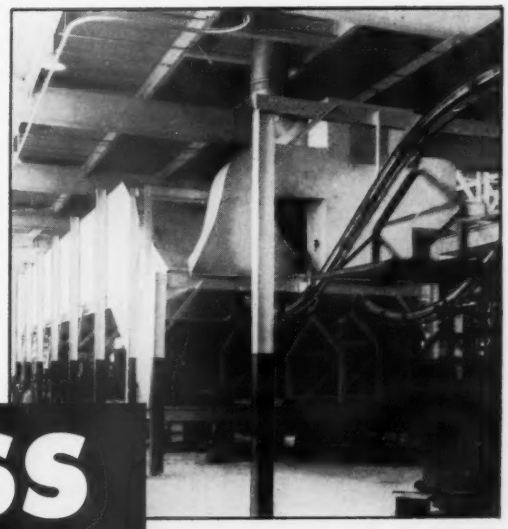

2

ROSS Controlled AIR UNITS

★ Help to Produce Better Castings

★ Help to Lower Production Costs

ROSS CORE OVENS

Properly controlled heat is the key to core baking that is consistently successful. Uniformity in baking in either batch or continuous ovens depends largely upon the skill with which the hot baking air is made to enter and then to circulate throughout the oven.

To accomplish this, engineers must know the behavior of air under all conditions of temperature and pressures, and how to control that air.

The consistently efficient operation of Ross Core Ovens in both ferrous and non-ferrous Foundries can be traced right back to this understanding of air movements.

ROSS CUPOLA AIR PRE-HEATERS

Here, too, the control of both the heating and the flow of the hot combustion air for the cupola charge is based on a thorough knowledge of air behavior.

The ROSS Hot Blast System delivers air up to 500°F. The new ROSS Tubular Heater ranges up to 1000°F. at 5 pounds pressure or higher. Both of these can be tied in with present cupola operations without interfering with them. Existing blowers can be used.

You don't have to wait for a new foundry or new cupola to take advantage of the operating benefits these two ROSS Units can bring to your production schedule and cost structure. Why not ask to have a Ross Engineer call and discuss your problem of core curing and of getting better production from your furnace.

J. O. ROSS ENGINEERING CORPORATION

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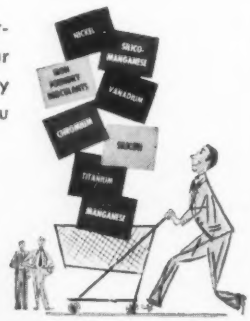
Though we call ourselves the "Foundry Alloy Supermarket" we do offer personal service. . . . Our foundry engineers will be happy to answer any questions you may have, or otherwise work with you in any way they can.

For a thorough description of forms, analyses, and uses of more than 30 stock ferro alloys write for bulletin FAI.



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might be responsible for the different results.

Joe went home talking to himself. He then procured exactly the same materials (same brand) that Bill was using. He followed Bill's practice in mixing and molding, and, incredible as it may sound, he obtained exactly the same results as Bill.

Joe then began to scratch his head, wondering just what was wrong with his former practice? He didn't want to upset his whole system and adopt Bill's. After all, his sand system had performed reasonably well prior to his recent trouble. He began to ask more questions and delve deeper into the mysteries of sand behavior, and he soon found that by exercising a *compromise-balance* with cushioning material, clay and water, he could duplicate Bill's success with his own sand. Compromise was the key to the solution!

Not Alone—It has been said that misery loves company, and, happily, we are not alone in our foundry difficulties. The ceramist and the cement men have complaints closely approximating those of the foundryman. We have exchanged notes profitably with these industries.

A formula for a specific grade of concrete may constitute standard practice in Illinois, but fail miserably when attempted in Oregon. (I get this information from an authority on the subject.) The Oregon people were compelled, under the laws of economics, to use a local sand and gravel which defied the rules of Illinois. Compromise had to be made in the ratios of cement and water.

There are conditional changes in our foundry sand mixes which present laboratory instruments will not indicate. By their very challenge, they provide the incentive that makes this business so intensely interesting in its anticipation of the dawn of a more glorious tomorrow!

Book Review

A Practical Guide to the Design of Gray Iron Castings for Engineering Purposes, cardboard, spiral bound, 55 pages, 8 x 10½ in., published by the Council of Iron Foundry Associations, 14 Pall Mall, London, S. W. 1, England. Price $2.

A translation of a French work first published in 1954, this publication is intended to help both ironfounders and their customers achieve greater economy and efficiency in the design of gray iron castings. The text incorporates 104 line drawings illustrating ways in which design enters into the ironfounder's problems of producing a satisfactory casting at its lowest possible cost.

Quickly and Economically with Norbide® Pressure Blast Nozzles

You'll find there's a NORBIDE Nozzle available to give you exactly the type of cleaning stream you need — from a pencil-thin stream for cleaning hard-to-get-at spots to a broad stream for large areas. And NORBIDE Nozzles - lined with the hardest manufactured material commercially available — maintain stream contour, last longer than any other nozzle made and deliver maximum blasting efficiency at minimum cost per hour.

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Heating Equipment Has Good Outlook for 1957

IHEA Sees Continuation of Last Year's Active Demand

INCREASED appreciation of the heat-treated properties of metals has been a factor in the rising trend in demand for industrial heating equipment.

This circumstance was indicated at the annual meeting of the Industrial Heating Equipment Association held at the Shoreham Hotel, Washington, Jan. 28-29. Sales last year of association members reached a peacetime peak and are expected to hold near that level in 1957, it was reported by Elton E. Staples, IHEA president and executive vice president, Hevi-Duty Electric Co., Milwaukee.

Approximately 75 representatives of member companies attended the association's meeting, the program for which was built around the theme of better management.

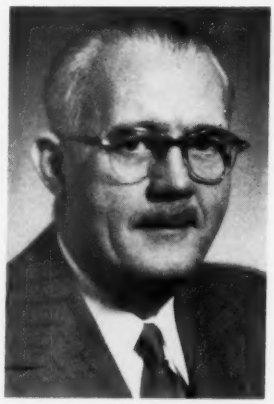
At the annual election of officers, Walter Holcroft, executive vice president, the Holcroft Co., Detroit, was elected president to succeed Mr. Staples. Other officers chosen are: Vice president, C. Floyd Olmstead, president, Lee Wilson Engineering Co., Cleveland; executive vice president, Carl L. Ipsen, Washington; treasurer, Ralph E. Whittaker, secretary, Swindell-Dressler Corp., Pittsburgh.

Newly elected directors are: A. E. Tarr, assistant to the president, Leeds & Northrup Co., Philadelphia; A. R. Robertson, president, Wayne Industrial Furnace Co., Detroit, and R. L. Harper, executive vice president, Harper Electric Furnace Corp., Buffalo.

Price inflation has aggravated the inadequacy of the commonly used depreciation method on plants and equipment, it was declared by Dr. George Terborgh, research director, Machinery and Allied Products Institute, in speaking on "Tax Depreciation Policy."

Speaking at the annual banquet, Dr. Forrest Kirkpatrick, assistant to the president, Wheeling Steel Corp., pointed out that responsibilities of management have incerased in recent years, but opportunities are correspondingly greater. Among these responsibilities, he said, are the development of the proper atmosphere to bring out the best in individuals, the tapping of hidden talents among these individuals and the providing of better communication between management levels.

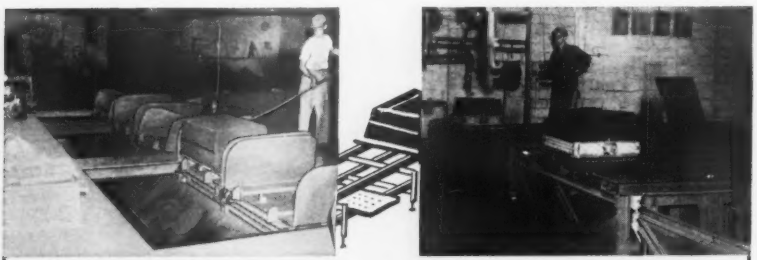
An optimistic note regarding general 1957 business prospects was sounded by James M. Dawson, vice president, National City Bank, Cleveland. After citing the consensus of economists concerning this year's probable score for various significant business indexes, he pointed out that most of these indexes already are above levels predicted for 1957 as a whole. This means that a slowdown is to be expected at some time during the remainder of the year.



WALTER HOLCROFT

N. A. Olsen, deputy director, Metalworking Equipment Division, Business and Defense Services Administration, Department of Commerce, outlined the function of his division and discussed a special census of industrial heating equipment manufacturers to be conducted by the Department of Commerce under the sponsorship and support of the association.

It was announced that the spring meeting of IHEA will be held May 19-22 at the Homestead, Hot Springs, Va. The next annual meeting is scheduled for the Penn-Sheraton Hotel, Pittsburgh, Jan. 27-28, 1958.

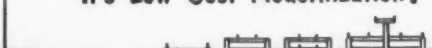


SMOOTH FLOW OF MOLDS IS GUARANTEED
Using the NOMAD Track and Pallet System

Molds are set on roller-equipped pallets, "rolled away" on conveyor track and poured. The molds are moved to the Mold Dump and dumped. Pallets then roll onto the lower return track automatically returning to the molding end of the conveyor where the Pallet Raiser lifts the pallet into position ready to receive the next mold.

This cycle of molds and mold handling equipment results in increased production, economy of space, reduced scrap and reduced manpower.

It's Low Cost Modernization!



NOMAD FOUNDRY EQUIPMENT

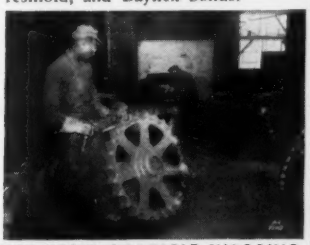
WESTOVER CORPORATION
NOMAD EQUIPMENT DIVISION
3110 W. FOND DU LAC AVE. • MILWAUKEE 10, WIS.

Gray Iron Officers Elected

At a regular meeting of the Philadelphia-Reading Management and Cost Group of the Gray Iron Founders' Society, the following new officers were elected: Chairman, R. J. Kuntz, Aldrich Pump Co., Allentown, Pa.; vice chairman, W. S. Thomas, Emmaus Foundry & Machine Co., Emmaus, Pa.; secretary-treasurer, I. J. Rentz, Textile Machine Works, Reading, Pa.

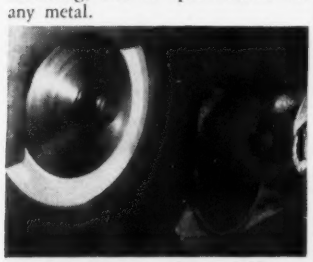
FOR NOTCHING GATES AND RISERS, and cleaning castings, Bay State provides *five* different raised hub disc-wheels to grind everything from Aluminum to Stainless.

FOR LIGHT PORTABLE GRINDING, small wheels, cones, plugs, and mounted wheels in all standard sizes, shapes, and specifications. Vitrified, resinoid, and Bayflex bonds.



FOR HEAVY PORTABLE SNAGGING: straight wheels and flaring cups of all sizes, for both high and low speed machines, right angle head or straight, to fit any shaft.

FOR FLOOR STAND SNAGGING, vitrified resinoid, and Bayflex bonded straight wheels to fit any machine mounting, and in specifications for any metal.



FOR CUTTING OFF, *three* different reinforced cut-off wheel designs, plus rubber and resinoid non-reinforced types . . . a product for every foundry cut-off job.

FOR SWING FRAME SNAGGING, rugged resinoid bonded snagging wheels grind fast and efficiently where there's a lot of metal to take off the casting.

BAY STATE PROVIDES GRINDING WHEELS FOR EVERY CLEANING ROOM JOB

Because Its Service is Complete, Bay State is Your Surest Way to Lower Foundry Grinding Costs.

Foundries do over 20% of the grinding done in this country! That's a good reason why a large part of the Bay State research, development, and engineer-training programs concentrate entirely on foundry grinding wheels.

It's this concentration which has given Bay State a complete line of products plus outstanding abrasive engineers . . . and you need *both* to take advantage of *every* chance to cut your grinding costs.

It makes sense that your surest way to lower foundry grinding costs comes from the company which is best equipped with every product and service required for the job. Try it, by calling in your Bay State Distributor, or writing direct to Bay State Abrasive Products Company, Westboro, Massachusetts.

BAY STATE ABRASIVE PRODUCTS CO.
Westboro, Massachusetts, U.S.A.

Branch Offices and Warehouses:
Bristol, Conn, Chicago, Ill., Cleveland, Ohio, Detroit, Mich., Pittsburgh, Pa.
Distributors — All principal cities
In Canada:
Bay State Abrasive Products Co. (Canada) Ltd., Brantford, Ont.

BAY STATE
WHEELS of PROGRESS

Around the Country

NEWS REPORTS FROM

Chicago . . . Pittsburgh . . . Philadelphia . . . Cleveland . . . Boston

Boston—Mystic Iron Works, Everett, Mass., lost production of about 13,500 tons of pig iron as result of a recent strike. It resumed operations Jan. 27, after being banked 27 days. No serious shortage of iron resulted; suspension was anticipated and December shipments were heavier than normal. Mystic also resumed shipments promptly from stockpile.

Labor costs are up 12 cents an hour in addition to fringe benefits, and second quarter Mystic prices are likely to increase more than in recent quarters. Prices are based on average costs for three months previous to each quarter, exclusive of the month nearest following quarter, in this case, March. December, January and February costs will be used for price basing and for the latter month costs will be up substantially. This arrangement covers contract customers with Mystic, or most of the New England foundries.

Philadelphia—Casting demand is gaining momentum, but not as fast as was anticipated by some operators. Most gray iron job shops are able to operate at close to five days a week but are having difficulty building up backlogs. On an average they still have no more than two or three weeks' work on hand.

Major activity is noted in auto die work, power transmission, material handling equipment and road construction requirements. Two northern New Jersey shops have been going at capacity on road construction castings and see no letup in sight.

Lagging badly are soil and pressure pipe operations, with a goodly portion of output going into inventories. Despite the approach of spring, pipe demand has picked up only slightly. Drop in machine tool orders has resulted in deferments in casting specifications but no cancellations. Machine tool builders still have heavy backlogs and indicate that they will need a continued heavy volume of castings, although not as fast as originally scheduled. Overall, gray iron job foundries report much less activity in light work than in the heavier.

Steel foundries are operating at least five days a week, with backlogs ranging six to eight weeks. In addition to work for heavy mill equipment builders, cast steel producers report an increasingly active demand from the shipyards.

Malleable operations continue at a good level, but with some inventory building, especially in fittings. In general, backlogs are fairly extended. The Pennsylvania Malleable Iron Corp., Lancaster, Pa., expects to have its $200,000 addition in operation in April. This company is a jobber, specializing in light work.

Brass and bronze job shops find business spotty, not only as to character of products but in orders for a single type of product. For example, orders may be good for a few days, then there will be a longer period when the bottom appears to have dropped out of things. Some shops find it difficult to operate at better than four days a week. Jobbers also are hurt by a lack of overflow from the captive shops, some of which are quite busy on industrial pumps and valves and ship needs. However, at the rate ship work is expanding, business in this line should begin filtering through to a number of shops shortly. Some independents already are beginning to feel the effects.

Meter business is still tapering. Possibly 75 per cent of meter business, it is said, is placed by municipalities, and a number of these haven't yet budgeted funds for such requirements. Further, housing starts have gotten off slowly, a factor also reflected in a sluggish demand for plumbing supplies. There should be some gain with the approach of spring. Light metal shops are adversely affected by the continued lag in household appliance specifications.

Raw material supply is adequate (metal ingots more than adequate). The Swedeland, Pa., pig iron producer expects to close down its smaller stack for major repairs and enlargement March 31, following earlier deferments. It will have relatively little merchant tonnage to offer for a few months, it is indicated. However, most consumers see a relatively free supply of iron ahead. Foundry coke is readily available but

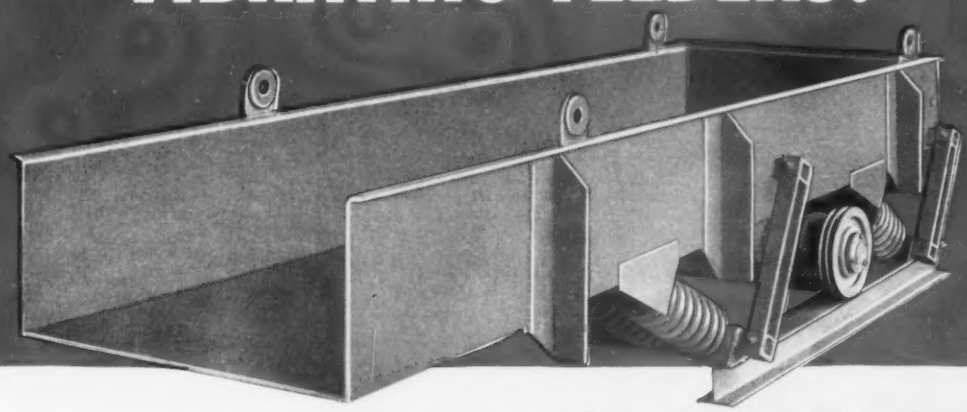
SUPPORT MUSEUM FOUNDRY: Alert to the value of the Chicago Museum of Science and Industry in encouraging teenagers to enter the foundry industry, members of Chicago Chapter, AFS, have presented $1000 toward its maintenance. Daniel MacMaster, museum director, right, received the gift from, right to left, Robert Schauss, Werner G. Smith Inc., chapter chairman; H. M. Krueger, American Brake Shoe Co.; Erle Ross, Chicago editor, FOUNDRY

LOST PRODUCTION IS EXPENSIVE!

Less Maintenance, Less Downtime With

CARRIER

NATURAL-FREQUENCY VIBRATING FEEDERS!



UNLIKE MOST MAGNETIC OR MECHANICAL FEEDERS, Carrier Natural-Frequency Feeders use heavy-duty coil springs *as a source of driving energy!* The springs compress and expand — alternately storing, then giving back the same amount of power to the trough. This exclusive Carrier Natural-Frequency design guarantees low maintenance and less downtime because INPUT HORSEPOWER IS LOW AND DRIVE STRESSES ARE UNIFORMLY DISTRIBUTED!

Furthermore, Carrier Natural-Frequency Feeders have only *four simple operating parts* — trough, heavy-duty coil springs, base member, and motor-driven rotating weight!

As you can see at the right, low maintenance and less downtime are only two of *many* Carrier advantages. Whatever your feeder requirements, chances are a Carrier Natural-Frequency Feeder will do a better job — *and save you money, too!* For full engineering details, write for a copy of our new Bulletin 1001. Carrier Conveyor Corporation, 243 N. Jackson Street, Louisville 2, Ky.

Low Horsepower — Natural - Frequency feeders use less than two-thirds the horsepower of any other type of feeder for the same capacity.

Choice of Lengths— Standard units are 6′, 8′, 10′ or 12′. Greater lengths also available.

Special Designs— Units available with grizzly decks, screen decks, dust-proof covers.

Instantaneous Start-Up — No warm-up period required.

Mechanical Dependability — No complicated electrical system required.

Simple Construction — Stock bearings used throughout.

High Temperature Units—For materials up to 2500°F.

PLUS — Rugged construction . . . easy installation . . . low reaction to supporting structure . . . less damping under load and improved efficiency.

Circle 687 on Inquiry Card—Page 225

You need Pangborn DUST Control in your plant!

Uncontrolled dust in your plant is a costly, needless expense. Dust wears away delicate machinery and clogs working parts, increases down-time and repair costs.

Pangborn Dust Control stops that. Pangborn Collectors trap dust at the source, clean so thoroughly that in the winter many firms cut heating costs by recirculating the already-heated, cleaned air.

In addition, Pangborn gives you the bonus benefits of lower housekeeping costs, more efficient employees, better employee and community relations and extra profits from any salvage value. Complete line of collectors for all jobs.

Discover how *you* can profit from Pangborn Dust Control—write for Bulletin 922, PANGBORN CORP., 1400 Pangborn Blvd., Hagerstown, Md.

Pangborn CONTROLS DUST

at higher prices. Ferrous foundry scrap prices have leveled off and no early changes are anticipated in most ferroalloys. No shortage exists in these materials, either.

Lincoln Foundry Co., Plainfield, N. J., producer of light gray iron castings, has gone into bankruptcy.

Cleveland— Northeastern Ohio Chapter of AFS has been the focal point of much of the news in the foundry industry in this area so far in 1957. During January, the chapter presented a symposium on gating and risering at Case Institute of Technology which attracted an average of well over 150 persons to each of the four weekly meetings.

On Feb. 11, the chapter presented a television program on the theme of light metal casting over KYW-TV, Cleveland, as part of a series of programs sponsored by the Joint Engineering Societies Council to portray various industries in Cleveland. Remote control cameras shot molding and pouring scenes for the program at the Cleveland foundry of Aluminum Co. of America.

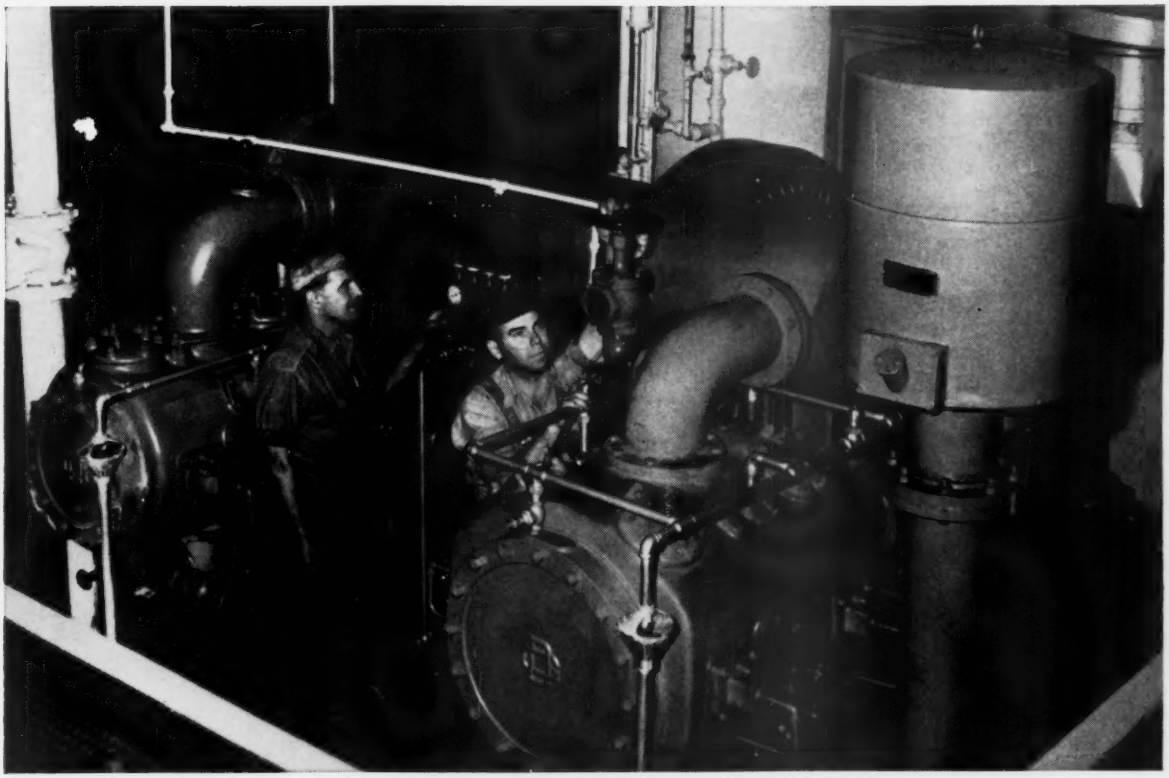
March 19-21, the Harry Dietert Sand School will be in session at Case Tech from 9 a.m. to 4 p.m.

Chicago—History was made in the Chicago area on Saturday, Feb. 9. On that date the first nuclear power system in the Western Hemisphere designed and built solely for experimentation in the generation of electric power was put into operation formally at Argonne National Laboratory of the Atomic Energy Commission.

Known as EBWR — Experimental Boiling Water Reactor—it is the first reactor in the AEC's power reactor program to be completed. It is a direct cycle boiling, 20,000-kw (heat) reactor which provides the energy for generating 5000 kw of electricity. The electricity, which is enough to take care of a town of 7500 people, is used by the laboratory.

The reactor consists of a steel pressure vessel of 2⅜-in. wall thickness containing zirconium-clad uranium fuel elements, control rods and pure water. During nuclear reaction, the fissioning of uranium atoms releases heat which converts part of the water in the core to steam. The steam, at 600 psi is fed to a turbine-generator set that differs from conventional turbine-generators only in a few respects. The spent steam goes to a condenser, and the condensate is returned to the reactor pressure vessel.

The unique structure that houses

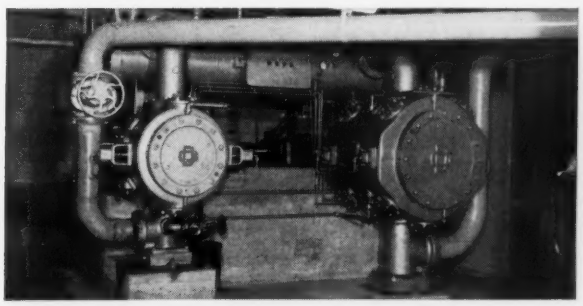


18 & 11 x 12 HAE compressor supplies 'round-the-clock air power in an aircraft plant.

"WE WANT 'ROUND-THE-CLOCK AIR POWER— Gardner-Denver compressors give it to us"

Here's why they picked this Gardner-Denver heavy-duty, full-load compressor for continuous service:

- Completely enclosed main frame with removable, bolted cover plates . . . working parts easy to reach for inspection and adjustment.
- Gasketed covers keep oil in . . . dirt out.
- Two crankshaft counterweights for better balance . . . greater efficiency . . . longer service life.
- Factory-trained staff for technical and engineering service from convenient branch offices.



Midwest metalworking plant relies on this HAE compressor for air power. Ask for Bulletin HAC-36.

9 x 9 RX compressor delivers air to container plant. Ask for Bulletin HAC-40.

ENGINEERING FORESIGHT—PROVED ON THE JOB
IN CONSTRUCTION, MINING, PETROLEUM AND GENERAL INDUSTRY

GARDNER - DENVER

Gardner-Denver Company, Quincy, Illinois

In Canada: Gardner-Denver Company (Canada), Ltd., 14 Curity Avenue, Toronto 16, Ontario

Core Hardness

with

Gordon & Campbell CORE HARDNESS TESTER

Why take chances with questionable cores? With this simple tester you obtain the true hardness value by measuring a definite depth of penetration of a spring-loaded abrading point. The hardness value is read direct on the graduated dial—no computation.

The Gordon-Campbell sand testing units offer the latest improvements for checking these critical properties of sand mixtures: clay content, permeability, bond strength, moisture, core hardness, and core strength. The tests are quick, and no calculations are required. They offer the simplest approach to sand control.

Write for full particulars on Gordon-Campbell sand control units. Savings in scrap losses will pay for these testing units.

All Gordon-Campbell sand testing units are designed to conform with the recommendations of the Committee on Foundry Sand Research of the American Foundrymen's Society.

FREE TO ANY FOUNDRYMAN

Write for this booklet. It explains foundry sand control and how to reduce scrap losses.

GORDON SERVICE

CLAUD S. GORDON CO.

Manufacturers & Distributors

Metallurgical Testing Machines • Industrial Furnaces & Ovens • Temperature Control Instruments • Thermocouples & Accessories

607 W. 30th St., Chicago 16, Ill.
2027 Hamilton Ave., Cleveland 14, Ohio

Circle 690 on Inquiry Card—Page 225

the power plant is a huge steel shell giving complete protection against the escape of radioactivity to the atmosphere, in event any part of the system is damaged. This shell, which will withstand 15 psi internal pressure, is sealed airtight when the reactor is operating. The power plant is operated by remote control from the adjacent control and service building.

Cost of the reactor project was about $5 million, and the fuel elements, weighing some 6 tons, are valued at $1.2 million. This fuel is believed sufficient to run the plant for from 3 to 10 years.

This reactor holds an important place in the AEC power program, not only by virtue of being the first such to be completed, but also because it offers a promising approach to economical nuclear power.

An inspection of the new Argonne reactor power plant reveals that castings are used widely and conspicuously in the construction. These castings are of wide size range and embrace all metals. A number are of stainless steel. Many of the castings are of the type found customarily in steam power plants; others are new in application to meet new requirements in generating power from nuclear energy. Even the reactor vessel itself makes use of several castings, mostly of stainless steel. The guides for the nine control rods are high-strength alloy gray iron castings about 6 ft long.

Nuclear power plants probably never will constitute any sizable market for castings, but each plant will require its share of them.

Pittsburgh—Most market observers report a lull in foundry activity in February. Sales of foundry equipment lack volume, although inquiries are fairly numerous.

Foundries supplying steel mills say sales are good despite prospects for a lower steel making rate in second and third quarters. Producers of ingot molds report that demand is very strong. Foundries supplying automakers comment that sales declined in February and that their customers are not adding to inventories.

Prices of ferrous scrap have receded so far this year, but price of coke has increased. Another problem facing foundrymen in this area is the possibility that a state smoke control law will be passed this year. Only a small percentage of local foundries have installed air cleaning equipment. A state law which would require purchase of such equipment would impose a financial burden on small foundries in particular.

Step ahead in this five billion dollar market with

Foundry's PLUS 5 SERVICE

What is PLUS 5? It's your key to more business from foundries. It gives every FOUNDRY advertiser a bonus he can get from no other source. Here is help in analyzing this market—studying sales territories and potentials—planning the sales effort—and creating a constructive promotion program to the 5 billion dollar foundry market. It's time to take a new look at this market—and at the unusual selling aids we have for you. Say PLUS 5 to your FOUNDRY representative and he'll show you this 5-step program designed to move more of your products into foundries.

A Penton Publication

FOUNDRY

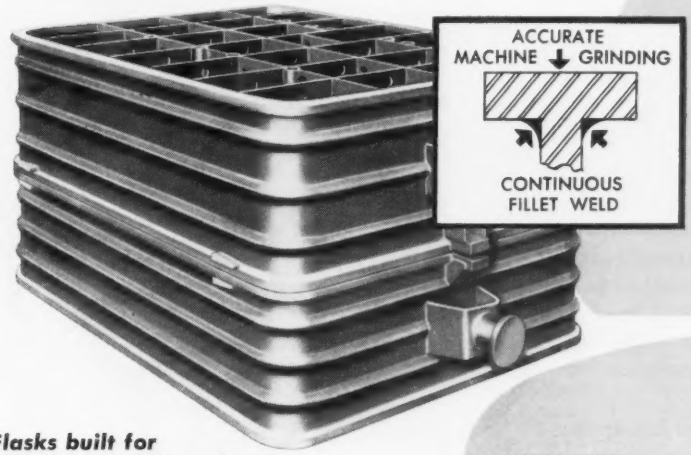
more than a magazine . . . a complete sales development service

Penton Building, Cleveland 13, Ohio

Are Your FLASKS MODERN?

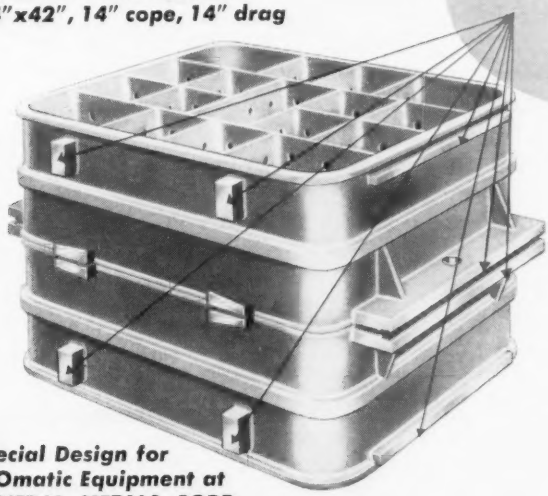
Are they built to withstand the greater pressures and rougher handling of modern foundry production? Or are they made for the slower, easier, foundry practices of twenty-five years ago?

Here at Shanafelt we are constantly improving flask design, changing our methods, adding new machinery, building the new type flask needed for modern foundry practices. For example:



Flasks built for
GENERAL METALS CORP.
24"x42", 14" cope, 14" drag

MACHINED PARTS



Special Design for
SPOmatic Equipment at
GENERAL METALS CORP.
24"x30¼", 10" cope, 10" drag

❶ Wide, thick flanges add strength to the flask and take rougher handling without distortion. In the past year we have more than doubled our capacity for continuous fillet welding these flanges, as well as our facilities for accurately finishing parting surfaces.

❷ Trends toward automation call for extreme accuracy of many flask dimensions. We are fully equipped for fast machining of these critical parts, such as end bars, special lugs, etc.

❸ The modern flask must not only be *built* more accurately—it must *hold* that accuracy. We have complete facilities for stress relieving to eliminate distortion which may occur from release of welding strains.

Here at Shanafelt we are keeping abreast of — or even ahead of — the changing foundry industry. Our slogan "Everything in Steel Flasks" could easily be revised to say "Everything in *Modern* Steel Flasks."

Tell us *your* flask requirements and we'll promptly submit construction suggestions and prices.

THE SHANAFELT MANUFACTURING CO.

2600 - 2700 Winfield Way N. E., Canton, Ohio

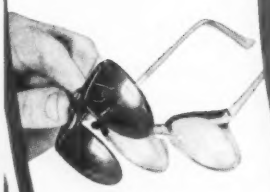
Circle 691 on Inquiry Card—Page 225

CESCO...RIGHT—BEFORE YOUR EYES!

New CESCO plastic frame safety glasses are available in 3 sizes:
No. 375 • 44x37mm.
No. 376 • 46x39mm.
No. 377 • 48x41mm.

Comfort Bridge safety glasses

Sideshield Comfort Bridge safety glasses



LITE-KLIP safety glasses

Flexible plastic goggles

New CESCO plastic frame safety glasses WITH ULTRA-MODERN LENS STYLE

• These new CESCO plastic frame safety glasses with the F7 shape lenses are not only superior in the safety glass field from the standpoint of fit and comfort, but many users prefer their shape and style to that of most personal glasses.

In addition to their fine appearance, these safety glasses have many outstanding features. Among them are:

Frames are rigid and will retain original shape without bowing

Choice of 2 colors—opaque slate (bluish gray) to eliminate light reflection, or translucent flesh

Nosepads are broad bearing to give comfortable distribution of weight

Lenses are interchangeable—the same lens fits either right or left side

Available in three sizes

CHICAGO EYE SHIELD COMPANY • **2324 Warren Boulevard, Chicago 12, Illinois**

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ASK your CESCO Safety Equipment Distributor to show you the new modern plastic frame safety glasses with the F7 lens—and the many other safety glasses and goggles in the complete CESCO line

CESCO C E S C O **FOR SAFETY**

Foundry Statistics

ALUMINUM

(Shipments of castings—1000 pounds[1])

	Shipments				Unfilled Orders[2]
	Total	Sand	Perm. Mold	Die	
1954	623,054	156,555	214,407	245,291	.....
1955					
Nov.	74,580	13,680	26,284	33,997	127,471
11 mo.	752,371	150,827	273,303	320,719	.....
Dec.	74,791	14,655	25,046	34,484	123,881
Total	827,162	165,482	298,349	355,203	.....
1956					
Jan.	74,152	15,861	24,528	33,253	121,924
Feb.	73,096	15,560	23,963	32,949	115,958
Mar.	73,785	16,597	22,816	33,965	110,642
Apr.	67,880	14,732	20,718	31,782	106,477
May	65,786	15,570	19,699	29,814	102,121
June	58,189	13,448	19,067	25,027	102,068
July	52,955	12,398	16,388	23,491	106,620
Aug.	61,407	13,100	18,067	29,553	109,352
Sept.	62,503	12,354	17,855	31,640	111,785
Oct.	74,209	14,389	21,120	37,782	110,818
Nov.	69,741	14,333	20,673	33,929	113,356
11 mo.	733,703	158,342	224,894	343,185	.....

MALLEABLE IRON

(Shipments of castings—net tons[1])

	Shipments		Standard		Pearlitic		Unfilled Orders[2]
	Total	For Sale	Total	For Sale	Total	For Sale	
1954	812,016	461,982	.....	.....	.....	.....	.....
1955							
Nov.	99,280	58,069	.....	.....	.....	.....	116,981
11 mo.	1,004,829	592,143	.....	.....	.....	.....	.....
Dec.	99,946	60,409	.....	.....	.....	.....	123,107
Total	1,104,775	652,552	.....	.....	.....	.....	.....
1956							
Jan.	93,562	54,618	79,406	45,747	14,156	8,871	116,520
Feb.	93,533	54,466	80,601	47,606	12,932	6,860	113,616
Mar.	86,941	46,266	75,384	40,869	11,557	5,397	106,491
Apr.	83,320	47,064	72,763	41,449	10,557	5,615	99,573
May	80,138	51,053	69,593	44,424	10,545	6,629	93,677
June	75,635	45,022	66,300	26,791	9,335	5,513	86,247
July	54,340	31,300	45,977	26,881	8,363	4,419	92,078
Aug.	74,422	43,479	62,867	36,759	11,555	6,720	91,883
Sept.	69,380	41,902	59,071	35,534	10,309	6,368	92,553
Oct.	81,528	50,219	68,769	43,109	12,759	7,110	92,734
Nov.	82,717	47,979	68,549	40,107	14,168	7,872	89,977
11 mo.	875,516	513,368	749,280	429,276	126,236	71,374	.....

COPPER-BASE ALLOY

(Shipments of castings—1000 pounds[1])

	Shipments			Unfilled Orders[2]
	Total	Sand	Perm. Mold	
1954	834,668	751,917	48,848	.....
1955				
Nov.	90,222	80,813	5,808	57,145
11 mo.	920,741	827,663	56,738	.....
Dec.	88,167	78,204	6,373	57,241
Total	1,008,898	905,867	63,111	.....
1956				
Jan.	89,767	80,116	6,135	58,445
Feb.	91,706	82,244	5,888	57,515
Mar.	96,085	85,094	6,299	65,560
Apr.	90,679	81,333	5,835	68,106
May	89,188	80,105	5,448	58,789
June	78,921	70,260	5,052	55,019
July	60,926	55,027	3,193	59,661
Aug.	77,619	70,479	3,805	56,364
Sept.	72,109	64,887	3,930	56,990
Oct.	81,049	73,058	4,104	54,363
Nov.	72,866	65,022	4,114	52,643
11 mo.	900,915	807,625	53,803	.....

MAGNESIUM

(Shipments of castings—1000 pounds[1])

	Shipments		Unfilled Orders[2]
	Total	For Sale	
1954	25,777	22,950	.....
1955			
Nov.	2,324	2,147	5,805
11 mo.	25,601	23,278	.....
Dec.	2,253	2,016	5,981
Total	27,854	25,294	.....
1956			
Jan.	2,959	2,600	6,237
Feb.	2,977	2,720	6,704
Mar.	3,046	2,842	6,414
Apr.	3,140	2,949	7,137
May	3,021	2,801	7,293
June	2,949	2,765	7,850
July	2,810	2,666	7,937
Aug.	3,059	2,860	8,201
Sept.	3,079	2,863	8,193
Oct.	3,442	3,187	7,893
Nov.	2,892	2,715	7,984
11 mo.	33,374	30,968	.....

PRODUCTION WORKERS

Estimated Number

	Nov. 1956	Oct. 1956	Nov. 1955
Ferrous	205,500	205,700	213,600
Nonferrous	67,000	66,600	67,600

Average Weekly Earnings

Gray Iron	85.41	84.84	87.96
Malleable Iron	85.84	85.67	85.90
Steel	95.08	96.87	93.52
Nonferrous	90.76	91.69	88.60

Average Weekly Hours

Gray Iron	40.1	40.4	42.7
Malleable Iron	40.3	40.6	41.9
Steel	41.7	42.3	42.9
Nonferrous	40.7	41.3	41.4

Source: Bureau of Labor Statistics

GRAY IRON CASTINGS—SHIPMENTS

(Net Tons[1])

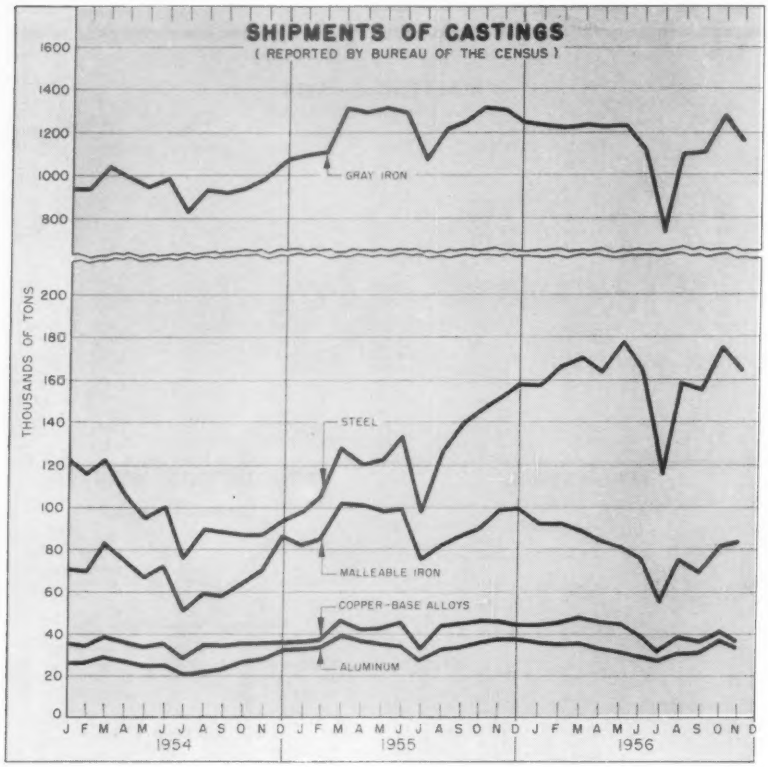
	All Castings		Miscellaneous Castings		Heavy Steel Ingot Molds		Chilled Railroad Car Wheels	Pressure Pipe & Fittings	Soil Pipe & Fittings	Unfilled Orders[2]
	Total	For Sale	Total	For Sale	Total	For Sale	Total	Total[3]	Total[3]	
1954	11,532,158	6,322,989	7,292,292	3,064,886	1,784,625	843,899	325,859	1,376,671	743,711	.....
1955										
Nov.	1,305,633	696,523	797,854	327,580	262,506	127,739	29,795	148,560	66,918	1,061,546
11 mo.	13,804,490	7,459,952	8,533,403	3,468,741	2,495,722	1,264,684	369,834	1,565,855	839,666	.....
Dec.	1,259,740	633,993	786,480	328,445	262,056	133,115	30,833	133,935	46,436	1,075,477
Total	14,837,745	7,987,205	9,161,685	3,715,963	2,739,864	1,392,209	385,041	1,681,630	869,558	.....
1956										
Jan.	1,249,518	677,017	769,826	326,269	257,150	132,581	32,408	131,346	58,788	1,157,818
Feb.	1,214,769	680,494	739,786	322,956	242,207	128,643	35,074	133,254	64,448	1,140,765
Mar.	1,255,405	715,173	752,498	331,749	254,045	139,624	42,676	132,384	73,802	1,162,578
Apr.	1,218,000	702,145	719,109	314,968	237,486	130,473	39,325	151,670	70,410	1,144,870
May	1,235,631	737,081	702,834	321,413	243,719	131,294	38,419	171,859	78,800	1,086,122
June	1,152,156	686,896	656,778	298,578	217,135	102,405	34,028	170,122	74,093	1,041,315
July	762,611	487,736	509,702	241,771	9,556	7,003	32,484	144,964	65,905	1,109,069
Aug.	1,103,195	671,523	639,953	293,673	170,857	89,589	31,712	180,249	80,424	1,074,461
Sept.	1,109,943	648,784	623,743	282,824	233,823	117,708	35,361	151,081	65,935	1,037,283
Oct.	1,274,734	734,384	749,200	331,069	252,203	134,265	30,978	171,377	70,976	996,351
Nov.	1,175,572	634,856	720,263	303,938	251,262	131,321	27,852	116,157	60,038	916,723
11 mo.	12,751,534	7,376,089	7,583,692	3,369,208	2,369,443	1,244,906	380,317	1,654,463	763,619	.....

STEEL CASTINGS—SHIPMENTS

(Net Tons[1])

	All Castings			Carbon			Alloy			Unfilled Orders[2]
	Total	For Sale	Railway Specialties	Total	For Sale	Railway Specialties	Total	For Sale	Railway Specialties	
1954	1,184,096	880,158	135,581	802,321	580,474	120,309	381,285	303,428	15,315	.....
1955										
Nov.	152,381	116,908	25,635	111,571	84,064	24,050	40,810	33,518	1,585	453,113
11 mo.	1,407,824	1,075,792	215,837	996,850	747,210	199 996	414,348	324,913	15,821	.....
Dec.	158,982	122,201	29,003	116,872	88,894	26 919	42,110	33,307	2,084	475,335
Total	1,530,694	1,166,706	236,880	1,088,489	814,258	219,602	445,769	354,452	17,278	.....
1956										
Jan.	158,618	123,343	27,954	116,092	88,480	26,362	42,526	34,863	1,592	519,401
Feb.	165,398	128,598	30,833	123,279	94,998	29,112	42,119	33,600	1,721	567,330
Mar.	170,045	130,839	31,991	126,583	95,779	29,953	43,462	35,060	2,038	594,990
Apr.	163,708	125,015	27,475	121,723	91,332	25,302	41,985	33,683	2,173	600,242
May	178,227	142,025	35,949	134,919	107,575	33,695	43,308	34,450	2,254	608,275
June	164,661	129,147	31,296	122,483	95,621	28,801	42,178	33,526	2,495	597,103
July	117,984	96,350	19,833	88,971	72,837	18,545	29,013	23,513	1,288	611,233
Aug.	159,831	127,001	32,965	119,025	94,257	30,601	40,806	32,744	2,364	586,496
Sept.	155,046	121,705	33,496	116,905	91,266	31,314	38,141	30,439	2,182	562,937
Oct.	175,630	135,798	34,762	132,250	101,961	32,743	43,380	33,837	2,019	558,478
Nov.	164,114	126,900	28,284	122,212	93,262	26,436	41,902	33,638	1,848	545,862
11 mo.	1,773,262	1,386,721	334,838	1,324,442	1,027,368	312,864	448,820	359,353	21,974	.....

[1]Source: Bureau of Census. [2]For sale only. [3]All cast iron pipe is shipped for sale.


SHIPMENTS OF CASTINGS
(REPORTED BY BUREAU OF THE CENSUS)
THOUSANDS OF TONS
GRAY IRON
STEEL
MALLEABLE IRON
COPPER-BASE ALLOYS
ALUMINUM
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1954
1955
1956

COKE PRODUCTION AND CONSUMPTION

(Net tons*)

	Production	Consumption Total	Consumption By Foundries
1954	59,526,723	59,139,159	2,479,926
1955			
Nov.	6,545,862	6,577,008	285,021
11 mo.	68,285,215	69,317,312	2,869,116
Dec.	6,865,032	6,949,073	284,936
Total	75,150,247	76,266,385	3,154,052
1956			
Jan.	6,914,836	6,182,704	275,660
Feb.	6,476,135	6,506,044	260,949
Mar.	6,896,593	6,861,698	267,414
Apr.	6,633,363	6,572,836	247,664
May	6,725,396	6,587,030	241,558
June	6,235,691	6,163,668	214,484
July	2,301,442	1,596,570	193,431
Aug.	5,614,997	5,281,627	225,978
Sept.	6,453,229	6,609,309	211,015
Oct.	6,742,483	6,951,386	253,147
Nov.	6,535,843	6,686,982	236,982
11 mo.	67,530,008	65,999,854	2,628,282

INGOT BRASS AND BRONZE

(Shipments in net tons)

	1955	1956
Jan.	25,201	27,736
Feb.	25,349	24,949
Mar.	29,713	28,310
Apr.	27,641	25,808
May	23,708	23,437
June	23,141	18,842
July	18,513	17,364
Aug.	27,013	23,812
Sept.	26,349	20,929
Oct.	25,228	23,045
Nov.	25,102	21,818
Dec.	21,448	18,046
Total for year	298,406	274,096

Source: Defense Council of the Ingot Brass and Bronze Industry.

ZINC-BASE ALLOY

(Shipments of castings—1000 pounds[1])

	Shipments Total	Shipments For Sale	Unfilled Orders[2]
1954	520,458	322,802	.....
1955			
Nov.	74,960	47,433	93,001
11 mo.	707,193	445,840	.....
Dec.	70,807	47,404	86,120
Total	778,000	493,244	.....
1956			
Jan.	68,050	43,750	83,234
Feb.	66,854	42,300	76,283
Mar.	65,760	42,806	73,025
Apr.	58,274	37,518	71,730
May	52,205	33,920	60,634
June	47,775	31,983	61,809
July	42,227	27,301	64,806
Aug.	52,321	33,281	73,411
Sept.	46,340	33,967	79,390
Oct.	65,450	41,943	75,706
Nov.	64,972	39,718	74,623
11 mo.	630,228	408,487	.....

INDEX OF FOUNDRY EQUIPMENT ORDERS

Foundry Trades Only

(Net Orders Closed, New Equipment)

	1955	1956
Jan.	81.0	195.6
Feb.	90.4	169.0
Mar.	163.6	152.7
Apr.	178.6	135.2
May	145.7	207.0
June	186.8	156.7
July	213.4	110.3
Aug.	134.0	188.3
Sept.	156.7	114.7
Oct.	108.6	122.2
Nov.	154.4	121.0
Dec.	183.9	.....

Note: Figures are percentages of the base period 1947-49 taken as 100 per cent monthly average. This is a new base period. Source: Foundry Equipment Manufacturers Association.

IRON AND STEEL SCRAP CONSUMPTION

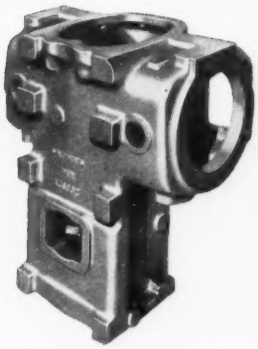
(Gross tons*)

	All Scrap Total	By Types of Furnace: Cupola Total	Air Total	Electric Total
1954	54,780,758	8,542,581	855,207	6,100,444
1955				
Oct.	6,443,349	944,685	113,411	820,642
10 mo.	59,716,778	8,923,376	1,045,978	7,087,218
Nov.	6,441,351	952,906	112,056	839,971
Dec.	6,496,796	910,675	115,436	830,404
Total	72,654,925	10,786,957	1,273,470	8,757,593
1956				
Jan.	6,688,977	909,201	114,378	880,980
Feb.	6,345,421	892,373	116,418	833,661
Mar.	6,733,076	923,912	101,087	863,950
Apr.	6,490,680	862,233	96,514	842,216
May	6,491,567	855,007	104,485	899,967
June	5,994,989	776,299	87,525	831,456
July	1,986,613	621,064	56,071	399,441
Aug.	5,473,927	803,123	92,200	807,131
Sept.	6,231,017	738,824	84,627	841,783
Oct.	6,722,320	890,389	101,773	935,008
10 mo.	59,138,587	8,272,425	955,078	8,135,593

PIG IRON PRODUCTION AND CONSUMPTION

	Production** (Standard grades—net tons) Total	Foundry	Malleable & Silvery	Basic	Low Phos. Intermediate Low Phos. & Bessemer	Consumption* (By type of furnace—gross tons) Total	Cupola	Air	Electric
1954	58,113,924	2,241,436	2,798,646	47,485,047	5,587,465	52,373,541	4,364,418	215,158	155,258
1955									
Dec.	6,887,667	242,446	329,607	5,660,307	655,307	6,131,680	444,459	23,520	21,971
Total	77,114,073	2,858,957	3,884,971	62,570,394	7,799,751	68,944,698	5,326,534	260,008	246,406
1956									
Jan.	6,985,945	210,755	317,276	5,806,140	651,774	6,275,224	441,634	24,062	11,766
Feb.	6,539,199	229,440	370,208	5,350,650	588,901	5,871,824	430,792	24,307	13,010
Mar.	7,083,877	196,533	352,856	5,843,852	690,636	6,316,836	427,177	23,737	18,725
Apr.	6,860,833	210,319	333,660	5,623,647	693,207	6,077,074	413,537	22,757	17,179
May	6,873,102	232,375	329,750	5,625,067	685,910	6,064,632	413,494	24,074	28,596
June	6,387,608	213,769	331,871	5,227,488	614,480	5,642,004	379,803	22,039	23,460
July-Aug.	6,191,039	337,077	382,633	4,854,879	616,450	963,749	303,341	14,702	5,582
Sept.	6,873,352	236,809	316,590	5,636,288	683,665	4,618,718	404,948	22,719	17,604
Oct.	7,246,650	245,762	321,188	6,001,279	678,421	6,053,147	366,848	19,642	18,239
Nov.	6,977,457	140,277	354,573	5,831,885	664,051	6,450,404	446,449	22,548	19,064
Dec.	7,268,743	149,745	322,631	6,099,101	697,266	.....	.....	.....	.....
Total	75,301,134	2,402,861	3,733,258	61,900,276	7,264,761	.....	.....	.....	.....

*Source: U. S. Dept. of Interior, Bureau of Mines. **Source: American Iron & Steel Institute. [1]Source: Bureau of the Census. [2]For sale only.



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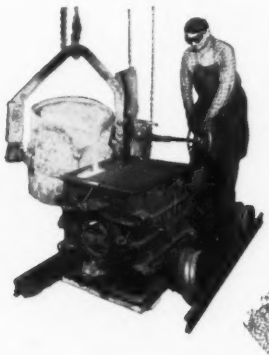

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COAL CHEMICALS • PROTECTIVE COATINGS • PLASTICIZERS • ACTIVATED CARBON • COKE • CEMENT • PIG IRON

California Conference Program Offers Variety of Subjects

Subjects of interest to both management and operating personnel are included in the program announced for the California Regional Foundry Conference. The meeting will be held March 15-16 at the Hotel Claremont, Berkeley, Calif., under the sponsorship of the Northern and Southern California Chapters of the AFS. The former chapter will be host.

The opening session Friday morning will include a discussion of air pollution control for the Bay Area by Benjamin Linsky, air pollution control officer for the district.

Reports and roundtable discussion of foundry education, apprenticeship subjects and Foundry Educational Foundation activities, plus a session devoted to foundry safety also will appeal to foundry management.

Subjects relating to general foundry practice include such topics as aluminum alloys, cupola practice, gating and risering, scrap control, high-vacuum melting, and foundry resins.

Charles R. Marshall, Industrial & Foundry Supply Co., Oakland, is general chairman of the conference committee, with William C. Baud, Mechanical Foundries Div., Food Machinery & Chemical Corp., Vernon, chairman of the Southern California Section. Technical Section chairman is Harold Hirsch, American Manganese Steel Div., American Brake Shoe Co., Oakland.

Friday, Mar. 15

Registration All Day Friday—Main Lobby, Hotel Claremont, Berkeley.

9:30 a.m.—**Air Pollution,** Benjamin Linsky, Air Pollution Control Officer, Bay Area Air Pollution Control District. Chairman, Ivan L. Johnson, Pacific Steel Casting Co., Berkeley.

10:30 a.m.—**Education—FEF—Apprenticeship.** Reports and roundtable discussions. E. Paul DeGarmo, chairman, Division of Industrial Engineering, University of California, Berkeley; Maurice C. Sandes, Division of Apprenticeship Standards, State of California; Clayton D. Russell, chairman, Apprentice Training Committee, Phoenix Iron Works Co., Oakland. Chairman, Earl Paltenghi, H. C. Macaulay Foundry Co., Berkeley.

12:15 p.m.—**Management Luncheon:** Chairman, Andrew M. Ondreyco, General Metals Corp., Oakland.

1:30 p.m.—Aluminum: **Modern Aluminum Alloys and Their Application in the Foundry,** Walter Bonsack, Jobbins Co., Los Angeles. Chairman, George W. Stewart, East Bay Brass Foundry Co., Richmond.

1:30 p.m.—Cupola Practice: **Coke and Its Relation to Cupola Operation,** John W. Rendall, Great Lakes Carbon Corp., St. Louis. Chairman, Samuel D. Russell, Phoenix Iron Works Co., Oakland.

3 p.m.—General Foundry Practice: **Gating for Pressure Casting and Economical Molding Practice,** Dominic Coccione, Washington Iron Works, Seattle. Chairman, Nino V. Davi, Pacific Steel Casting Co., Berkeley.

4:30 p.m.—Safety Color Sound Film: **Knowing's Not Enough,** F. H. Kobely, Columbia-Geneva Steel Division, U.S. Steel Corp., San Francisco. Chairman, Kenneth C. Zeller, American Manganese Steel Division, American Brake Shoe Co., Oakland.

5:30 p.m.—**Fellowship Hour.** Host, Columbia-Geneva Steel Division, U.S. Steel Corp., San Francisco.

7 p.m.—**Dinner.** Chairman, Harold E. Henderson, president, Northern California Chapter, H. C. Macaulay Foundry Co., Berkeley. Guest, Frank W. Shipley, National President, AFS. **The Foundry Contribution to Western European Recovery,** Prof. Gilbert S. Schaller, University of Washington, Seattle.

Saturday, Mar. 16

9 a.m.—Steel: **What Occurs after Mold Is Made until It is Poured Can Affect Cleaning Cost,** Hubert Chappie, National Supply Co., Torrance. Chairman, Hugh F. Prior, Superior Electrocast Foundry Co., South San Francisco.

9 a.m.—Brass and Bronze: **Scrap Control Procedures for Foundries,** Martin Dietl, Burndy Engineering Co., Lynwood. Chairman, Byron F. McDonald, Pacific Graphite Co., Oakland.

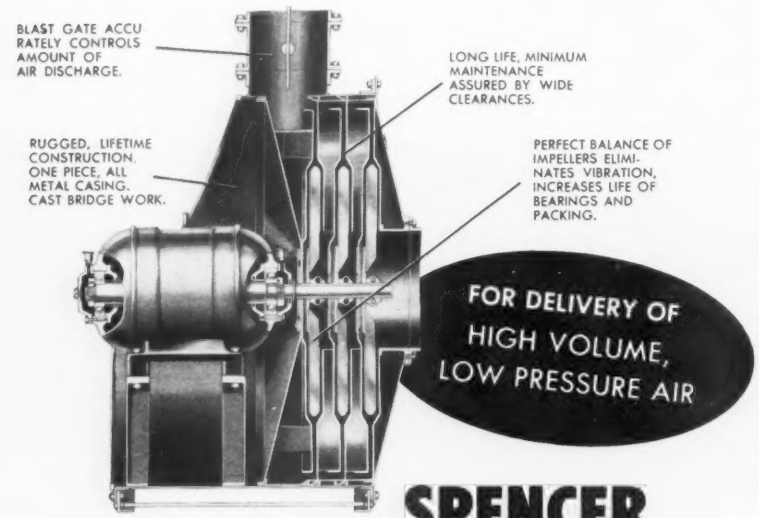
10:30 a.m.—Vacuum Processes: **Some Advantages and Limitations of Foundry Operation Conducted in High Vacuum,** Charles d'A. Hunt, Temescal Metallurgical Corp., Richmond. Chairman, Harold C. Wegner, Pacific Foundry Co., San Francisco.

10:30 a.m.—Foundry Resins: **Applications of Foundry Resins,** Lee Stark, Barrett Division, Allied Chemical & Dye Corp., Edgewater, N.J. Chairman, James L. Francis, Micro Metals Inc., Richmond.

12 noon—**Buffet Luncheon**

1:30 p.m.—General Foundry Practice: **Gating and Risering,** Harold F. Bishop, Exomet Inc., Conneaut, O. Chairman, Michael A. Furey, Mare Island Navy Yard, Vallejo. **Foundry Problems,** Harry H. Kessler, Sorbo-Mat Process Engineers, St. Louis. Chairman, Phillip McCaffery, General Metals Corp., Oakland.

5 p.m.—**Fellowship Hour.** Host, Kaiser Steel Corp., Fontana and Oakland.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PERFECT BALANCE OF IMPELLERS ELIMINATES VIBRATION, INCREASES LIFE OF BEARINGS AND PACKING.
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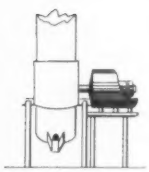
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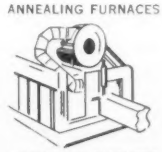
ANNEALING FURNACES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HARTFORD 6, CONNECTICUT

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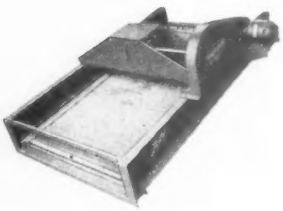

Foundry

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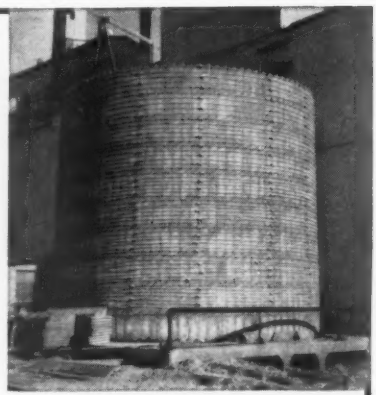
Circle 696 on Inquiry Card—Page 225

Neff & Fry Bin Being Erected for Handling Silica Sand



When photographed, this Neff & Fry Super-Concrete Stave Bin was being erected for the Ottawa Silica Co., Ottawa, Ill. It is the first of two 28′ x 40′ bins which are now completed and in use. Silica sand is supplied principally to glass manufacturers, foundries, and concrete producers.

Through our experience in building thousands of bins, we have mastered the techniques of handling and storing virtually all kinds of flowable bulk materials. This knowledge is at your service upon request. You are invited to communicate with us.

To understand the special advantages of our unique type of construction, ask for our folder, "Bins with the Strength of Pillars."

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THE NEFF & FRY CO. • 214 Elm St., Camden, Ohio

NEFF & FRY ➧ SUPER-CONCRETE STAVE STORAGE BINS

Malleable Founders' Society Holds Semiannual Meeting

Most malleable foundries were operating at about 80 per cent of capacity early this year, but backlogs generally were light. These circumstances were indicated by member companies attending the semiannual meeting of the Malleable Founders' Society in Cleveland, Jan. 18.

The meeting was devoted largely to progress reports on various of the society's activities. President Leon J. Wise, Chicago Malleable Castings Co., Chicago, presided.

James H. Lansing, technical and research director, discussed some of the current and prospective technical work being sponsored by the society. Such projects include studies of basic properties of malleable iron, creep rupture work in connection with high-temperature applications, corrosion-resistance testing, and study of hardness properties of standard and pearlitic malleable.

Ernest J. Stockum, Dayton Malleable Iron Co., Dayton, Ohio, outlined plans for the second annual Technical and Operating Conference, held in Cleveland Feb. 7-8 and reported in detail on Page 148 in this issue.

H. E. Steinhoff, Wagner Malleable Iron Co., Decatur, Ill., as chairman of the Handbook Committee announced that the manuscript for the revised handbook is expected to be completed by spring or early summer. Expanded data are being provided for the chapters on pearlitic malleable, machining, and design.

A large number of metalworking companies are prospective users of malleable castings, it was pointed out by Lowell D. Ryan, executive vice president, in an analysis of market potentials and methods of developing

BETTER CORES...FASTER...
FEWER PLATES...LESS SPACE

Thermex
ELECTRONIC CORE BAKING EQUIPMENT

Better cores. Lebanon Steel Foundry, Lebanon, Pa., has improved uniformity, hardness and tensile values of cores with THERMEX* Core Baking Equipment. Require less filing and fitting. Breakage nil. Spraying eliminated.

Faster production. Here, conveyor into THERMEX Unit extends 20 ft. to allow core makers to load from their stations. Dielectric heating has boosted output from 1600 to 4500 cores per shift. Estimated yearly savings: $10,000. At Repcal Brass Manufacturing Co., Los Angeles.

Fewer plates. Continuous flow of cores speeds turnover of core plates. Fewer plates are needed and being of plywood, they are cheaper. This core room cut core driers from 400 to 35. At James B. Clow & Sons, Coshocton, Ohio.

Less space. This is one of two 30 KW THERMEX Core Baking Units at Bendix Foundries, Bendix Aviation Corp., Teterboro, New Jersey. Entire baking operation is concentrated in small area. Continuous flow minimizes need for core storage. Special core runs can be made quickly.

*THERMEX—Trade-Mark Reg. U. S. Pat. Off.

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helpful new casting applications.

Influence of the Federal Reserve Board on interest rates—currently the highest in 25 years—was explained by Dr. Joel Segall, University of Chicago. The board's principal tools in regulating rates are the purchase or sale of government securities, adjustments in the discount rate, and changes in reserve requirements of member banks. Although prior to 1951 the board was generally in accord with the administration at Washington, since then it has acted independently.

Aluminum Association Elects Officers at Annual Meeting

S. D. Den Uyl, president, Bohn Aluminum & Brass Corp., Detroit, was elected president of the Aluminum Association at its recent annual meeting in New York.

Arthur V. Davis, chairman of the board, Aluminum Co. of America, Miami, Fla., was elected honorary chairman of the board. Everett G. Fahlman, president, the Permold Co., Medina, Ohio, who served as president of the association for the last two years, was elected chairman of the board.

Re-elected directors at large for three years were: George A. Ginsburg, secretary, United Smelting & Aluminum Co. Inc., New Haven, Conn.; David P. Reynolds, vice president, Reynolds Metals Co., Louisville, and Harry L. Smith Jr., vice president, Aluminum Co. of America, Pittsburgh.

S. D. DEN UYL

Three association vice presidents were elected: Russel B. Caples, president, Anaconda Aluminum Co., New York; W. E. Dunlap, president, Aluminum Extrusions Inc., Charlotte, Mich., and Frank R. Nichols, president, Nichols Wire & Aluminum Co., Davenport, Iowa.

The association's five active commodity divisions also held sessions and elected officers during the three-day meeting. In the Foundry Division, R. E. Hater, vice president, Aluminum Industries Inc., Cincinnati, was elected chairman; George N. Wright, general manager, Harsch Bronze & Aluminum Foundry, Division of Ferro Machine & Foundry Inc., Cleveland, was elected vice chairman, and Edward C. Bloomberg, president, Monarch Aluminum Mfg. Co., Cleveland, was elected division representative on the association's board of directors.

New Facilities Cost $1/2 Million

Precision Castings Co., Syracuse, N. Y., a division of Harsco Corp., has completed a series of integrated, automatic finishing departments for its die castings. The new facilities cost more than $1/2 million and include elaborate automatic equipment for cleaning, copper-nickel and chrome or brass plating, phosphate coating, electrostatic spray painting, baking and polishing.

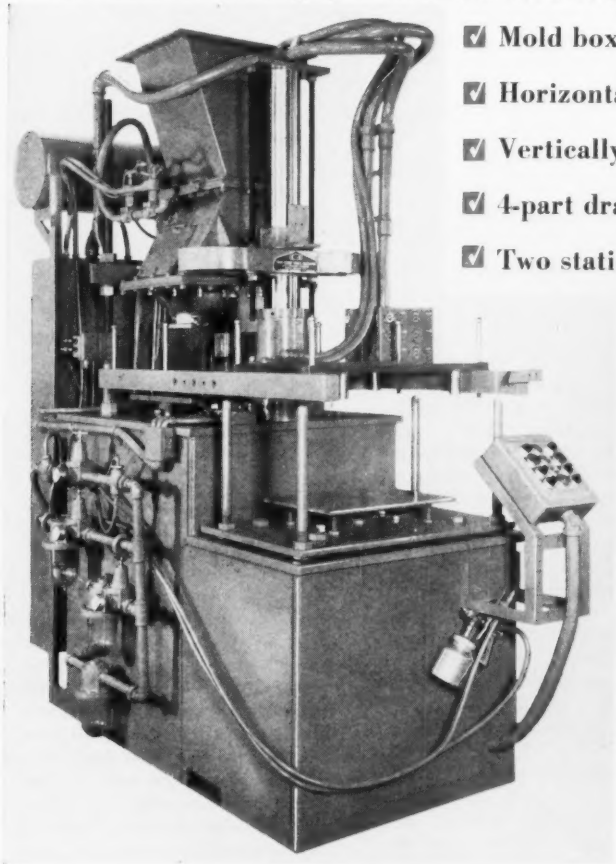
LOVE THOSE Golden WORDS...
from GOLDEN FOUNDRY CO.
COLUMBUS, INDIANA
It's all there in a letter from Don Alvis, Cleaning Department "Super", and here's the REAL BIG NEWS: Beginning with their initial order for a model 35A Standard twin-wheel, infinitely variable speed snagging grinder in 1948, Golden Foundry has since ordered FOUR MORE... another "proof-of-the-pudding" story for this unexcelled foundry grinder.
5 MACHINES IN 8 YEARS!
"SOLD ON THEIR MERIT"
"GOOD WHEEL ECONOMY"
"WILL PAY FOR THEMSELVES IN LESS THAN A YEAR"
"IMPRESSED WITH STURDINESS"
"SIMPLIFIED MAINTENANCE"
2-33VL Standard grinders at Golden Foundry — installed August, 1956
Booth 677 • Metal Expo • Los Ang. • Mar. 25-29
SINCE 1912
the STANDARD electrical tool co.
SNAGGING GRINDERS AND MACHINE TOOLS
2507 RIVER ROAD • CINCINNATI 4, • OHIO

for HIGH PRODUCTION shell cores, shell molds

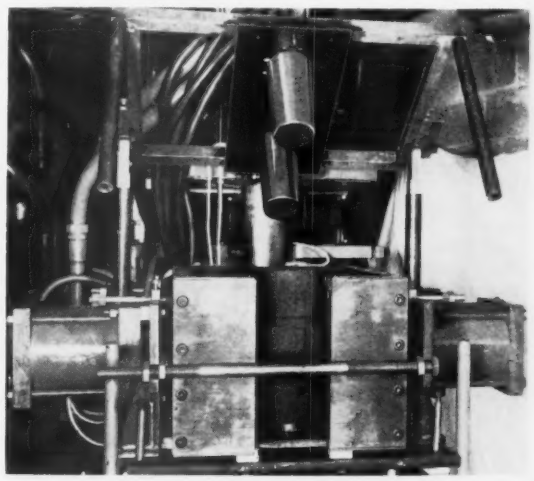
"BLO-CORE" SHELL MACHINE

Check these outstanding features →

- ☑ Core boxes up to 15" x 20" x 30" high.
- ☑ Mold boxes up to 16" x 22" x 16" draw.
- ☑ Horizontally-parted Mold Boxes.
- ☑ Vertically-split Core Boxes.
- ☑ 4-part draw split Core Boxes.
- ☑ Two station Rotary Operation. NO OVENS.



"BLO-CORE", Model HI-1622
TWO STATION, AUTOMATIC SHELL MACHINE.
SEE IT IN OPERATION. ASK FOR DEMONSTRATION.



Pictured above is a 4-part core box. Combination Vertical and Horizontal Parting Fixtures open and close the box in 4 directions and eject the finished shell core, complete, ready for immediate use. Write for full particulars on our parting fixtures for handling hot boxes.

No other shell machine is so flexible

C&S

WRITE TODAY FOR NEW BULLETIN CS-57

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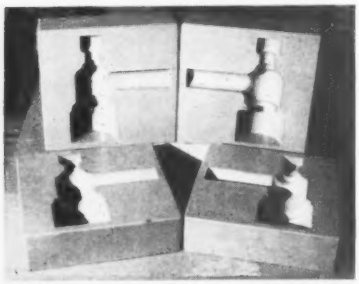
Circle 701 on Inquiry Card—Page 225

16 HOURS VS. 65 HOURS



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DEVCON — THE PLASTIC STEEL . . . originally developed for making tools, jigs and fixtures in metalworking plants . . . brought a revolutionary new method to this leading foundry* . . . chopping hours off the time required to produce core boxes, molds, duplicates of wood and metal patterns. Tremendous savings are being shown daily . . . making low cost patterns, repairing and altering patterns, filling large or small blow holes in ferrous and non-ferrous castings, repairing and rebuilding machinery, and making blow boxes and shell molds or driers.

DEVCON — available in A, B, C and F types — becomes a strong, tough, metallic mass (similar to steel or aluminum) within 2 hours after addition of the special hardening agent. Once hard, DEVCON can be drilled, tapped or sawed with metalworking tools. DEVCON is non-shrinking, non-expanding . . . adheres to ferrous and non-ferrous metals, wood, glass and many other surfaces.

*NAME ON REQUEST

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125 Endicott Street, Danvers, Mass.

Circle 702 on Inquiry Card—Page 225

What To Do about High Working Temperatures

Heat Lowers Efficiency And Can Be Dangerous

By Dr. W. Schweisheimer

THE metalworking industry always has faced the problem of protecting employees against the high temperatures involved in such operations as melting, pouring and heat treating metals. Very high temperatures, usually associated with low relative humidity, are common in foundries and other metalworking plants and are a concern from the standpoint of industrial hygiene.

As one answer, various types of protective garments have been designed, but most of them were too heavy and were disliked by workers. Recently, new aluminum-coated asbestos suits were developed to protect men working around industrial furnaces and kilns or fighting fires. These extra-lightweight suits have an aluminum layer thinner than the foil on a cigarette package. They are designed to permit a man to walk through areas as hot as 3000°F and to work for two or three minutes in 1400-degree heat. Made of one light, flexible layer, such suits protect their wearers by reflecting up to 90 per cent of the heat.

One study of the problem was made for hot environments in which the dry-bulb temperature ranged from 93 to 121°F and the wet-bulb temperature from 90 to 96°F. Results indicate that wet-bulb temperature determines the ability of men to work in hot environments.

When it is below 91°F, men can work easily, efficiently and with only mild changes in their body conditions. At wet-bulb temperatures from 91 to 94°F, men still are capable of prolonged, moderately hard work, but they work inefficiently, with difficulty and with less vigor and alertness. Moderately hard work at wet-bulb temperatures of 94°F and higher lead rapidly to total disability in most men, with excessive changes in body conditions. About one hour of such work is tolerated by most men.

Workers in foundries, steel mills, etc., would not be able to work if the human body did not have admirable faculties for retaining its normal temperature, even under very hot conditions. The temperature of human beings remains practically unchanged even when the surrounding temperature varies between 0 and 100°F or above.

One of the keys to a steady body temperature even in hot environments

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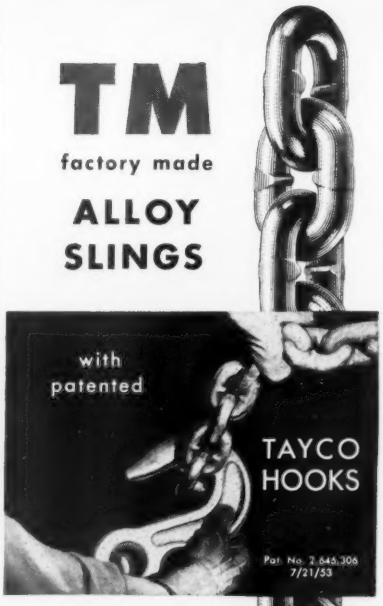

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Rugged TM factory made Alloy Sling Chains rate ace high in industry for safety, economy and long life. Taylor's rigid standards, plus Tayco Hooks...Gamma Ray Quality Control...Controlled Atmosphere Heat-Treating of popular sizes and Taylor's special analysis alloy steel are a few of the reasons why! Investigate the many other advantages of using these famous slings, today!

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Circle 703 on Inquiry Card—Page 225

is the perspiration system. The daily secretion of sweat may amount to more than 3 quarts—in very torrid atmospheres, in fact, it may be as much as 10 quarts or more. This body function requires that the individual drink an equal quantity of fluid to maintain normal water content. Since sweating also takes a large amount of salt from the body, it must be replaced as well.

Heat Illnesses—Three types of illness are caused by heat: Heat cramps, heat exhaustion and heat stroke.

Heat cramps are the mildest form of heat reaction. They cause contractions of muscles in arms, legs and the abdomen. It is helpful in such cases to replace salt lost by perspiration with salt tablets or with salt added to drinking water in a concentration of 0.1 per cent.

Prevention of heat exhaustion, the second degree of heat reaction (collapse of the circulatory system in the outer parts of the body), also is accomplished by the intake of adequate amounts of water and replacement of lost salt. Rest in a cool room is the usual cure.

Heat Stroke May Be Fatal

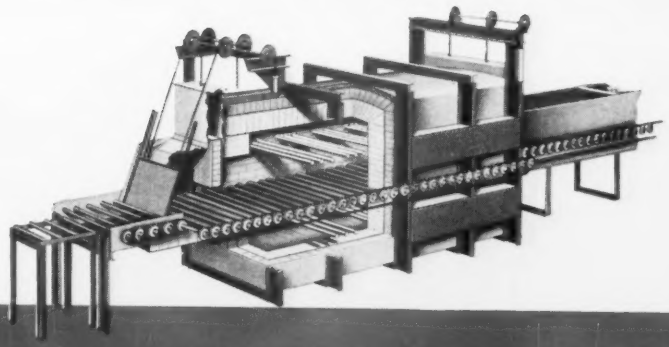
Heat stroke is the most serious form of heat reaction; it may be fatal in a few hours. In hot, humid surroundings, the natural giving off of body heat is decreased. The body temperature rises from the normal 98 to 99°F to a fever temperature of 105 and 106 degrees and even higher. In such cases, doctors try to replace water and salt in the body as quickly as possible, and they stimulate the heart.

A healthy metalworker should not contract heat stroke in his usual surroundings, but a few conditions favor such an occurrence: 1. Conditions of ill health such as influenza, skin disorders, malaria and other feverish diseases. 2. Consumption of liquor, which makes a worker more prone to heat stroke because alcohol is fuel for metabolism and helps to increase body temperature. 3. Excessive work rates and abnormally severe environmental conditions also may cause high body temperatures and eventual heat stroke.

A recent study on the effects of heat on metalworkers was carried out in a large plant where tinplate is produced.

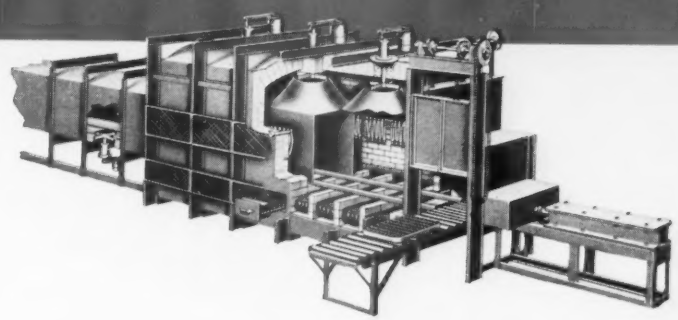
Some of the men worked at furnaces, some were metal platers, and others were employed in the rolling process. They worked at temperatures varying from 95 to 131°F. Blood samples were taken four times a day, and changes within the blood (sedimentation rate and coagulation) occurred. Part of the blood changes

BLAZING THE HEAT TREAT TRAIL WITH HOLCROFT



LET'S TALK ABOUT

the economy of electric heating



Low initial cost—simplified maintenance—efficient use of heat.

All these represent good reasons why electric heat treat furnaces are important considerations. For example, gas-fired and electrically-heated furnaces are frequently competitive; in fact, when total installation cost figures are considered, electric furnaces often have the price advantage.

Upkeep is reasonable, too, because properly designed and installed electric heating elements are so easy to maintain and adjust. Elements are quickly removed for repairs.

Electric heat is more efficiently used for applications in the high temperature range. There is a considerably smaller heat loss in the use of electricity than gas—shrinking the price spread between the two. To be specific, a thorough study must be made of all factors: local power and fuel costs, production demands, quality control standards, etc., before any final decision can be made of the type of heating to be used. Holcroft will help you—a good place to start is to send for our new book **Holcroft and the Electric Furnace.** It's yours without obligation. 5858

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A complete range of sizes, standard or made-to-order.

CHILLED CAST IRON SHOT & GRIT

For tough cleaning jobs or surface finishing of heat-treated parts.

HI-ALLOY "B" CAST IRON SHOT & GRIT

Hi-strength reduces fracturing due to impact.

MALLEABLE SHOT & GRIT

Best for impact type cleaning machines.

STEEL SHOT (Hardened and Drawn Cast Steel)

Ideal for cleaning and peening where carry-out and abrasive loss are minimized.

CUT STEEL WIRE SHOT (Hard Drawn Cut Steel Wire)

Extensively used in peening springs and other metal parts.

Catalog No. AB-53 will give you further details on these stocked items, as well as those manufactured as ordered.

ABRASIVE SHOT & GRIT CO., INC.

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was due to watering of the blood (hydremia) because of the excessive amounts of beverages employees consumed working in the high temperatures.

Experts agree that above approximately 85°F, working efficiency is decreased. Recent observations of men exposed to industrial heat exhaustion have shown that rest, food (with salt) and plenty of water were sufficient to restore all men so that they even could continue to work in the heat from furnaces for hours. Their conclusion was that heat exhaustion and ability to work in the heat are dependent almost wholly on the function of the heart and the blood vessels.

Cooling drafts of air can be obtained by cross ventilation or by electric fans. Fan velocities as high as 500 fpm were employed in industrial plants without any complaint by the workers, although some experts consider such high fan velocities to be irritating. Exhaust ventilation is helpful, but may be limited by the locality.

Air Supply Helps—Instead of using exhaust ventilation, it may be desirable to supply air. Such air may be taken directly from outdoors, or it may be cooled by water sprays. It is convenient to install the pipes supplying air along the ceiling of the workroom, where they are in contact with the hottest air.

Radiation from furnaces, kilns, driers, etc., can be prevented by proper insulation, and frequently a considerable amount of hot surface can be insulated. This insulation is particularly desirable for ventilation ducts.

The situation has been summarized as follows: The prevention of the ill effects of heat may best be accomplished by making sure that workers are in good physical condition and are acclimatized to the heat, that water is replaced hour by hour and salt day by day, and that workers eat a well-balanced diet with an intake of water-soluble vitamins.

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Light, tough, long-lasting — designed to reduce operator fatigue, minimize spillage and improve heat transfer. In 23 sizes, from ¼ lb. to 30 lbs.—with or without handles. A die-casting *must*.

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451. Conveyor Track

Westover Corp., Nomad Equipment Division, 3110 West Fond Du Lac Ave., Milwaukee 10, Wis.—Folder illustrates and describes the advantages of a double level conveyor track that brings a new concept to mold handling. Molds are set on roller-equipped bottom boards, rolled away, and poured. Bottom track can be pitched for gravity return of empty bottom boards or pallets to the molding area.

452. Care of Crucibles

Crucible Manufacturers' Association, 11 West 42nd St., New York 36, N. Y.—No. 8 in series, "Getting the Most from Crucible Melting," covers the proper care, installation and maintenance of large capacity crucibles.

453. Production Furnaces

Lindberg Industrial Corp., 2321 West Hubbard St., Chicago 12, Ill.—Bulletin covers large, field-erected production furnaces for all forms of metal heat treating, continuous enameling, aluminum melting and ceramic requirements. Corrtherm electric heating elements and vertical radiant gas-fired tubes are described and illustrated.

454. Wire Rope Slings

Macwhyte Co., Kenosha, Wis.—Catalog S-8 provides general information, computation, selection and ordering data useful in selecting wire rope slings. The catalog also illustrates and describes company's complete line of wire ropes, cables, slings, grommets, fittings, hooks, thimbles, links, shackles, sockets and turnbuckles.

455. Coreblower

Beardsley & Piper Division, Pettibone Mulliken Corp., 2424 North Cicero Ave., Chicago 39, Ill.—Bulletin 5010 illustrates and describes the CB10C Flexiblo coreblowing machine that provides pushbutton coreblowing for jobbing-foundry cores up to 12 lb.

456. Furnace Repairs

Kaiser Aluminum & Chemical Sales Inc., Dept. 257, 1924 Broadway, Oakland 12, Calif. — Manual, "How To Install Kaiser Periclase Brick and Ramming Mixes in Electric Furnaces" covers installation procedures for all sizes and types of electric furnaces. A section on furnace lining repairs and suggested methods for rebuilding and heating up furnaces is included. A fold-out chart for estimating brick requirements also is presented.

457. Die Casting Machine

Cleveland Automatic Machine Co., Cincinnati 12, O.—Bulletin illustrates and describes Models 50, 200, 400-N and 600 die casting machines. Both hot and cold chamber models are available.

458. Cleaning Room

Vacu-Blast Co., Belmont, Calif.—Leaflet describes a room for low-cost cleaning of castings with high visibility achieved through down-

FOUNDRY INQUIRY CARD

Circle item number for further information on anything described or advertised in this issue

MARCH 1957

401	426	451	476	501	526	551	576	601	626	651	676	701	726
402	427	452	477	502	527	552	577	602	627	652	677	702	727
403	428	453	478	503	528	553	578	603	628	653	678	703	728
404	429	454	479	504	529	554	579	604	629	654	679	704	729
405	430	455	480	505	530	555	580	605	630	655	680	705	730
406	431	456	481	506	531	556	581	606	631	656	681	706	731
407	432	457	582	507	532	557	582	607	632	657	682	707	732
408	433	458	483	508	533	558	583	608	633	658	683	708	733
409	434	459	484	509	534	559	584	609	634	659	684	709	734
410	435	460	485	510	535	560	585	610	635	660	685	710	735
411	436	461	486	511	536	561	586	611	636	661	686	711	736
412	437	462	487	512	537	562	587	612	637	662	687	712	737
413	438	463	488	513	538	563	588	613	638	663	688	713	738
414	439	464	489	514	539	564	589	614	639	664	689	714	739
415	440	465	490	515	540	565	590	615	640	665	690	715	740
416	441	466	491	516	541	566	591	616	641	666	691	716	741
417	442	467	492	517	542	567	592	617	642	667	692	717	742
418	443	468	493	518	543	568	593	618	643	668	693	718	743
419	444	469	494	519	544	569	594	619	644	669	694	719	744
420	445	470	495	520	545	570	595	620	645	670	695	720	745
421	446	471	496	521	546	571	596	621	646	671	696	721	746
422	447	472	497	522	547	572	597	622	647	672	697	722	747
423	448	473	498	523	548	573	598	623	648	673	698	723	748
424	449	474	499	524	549	574	599	624	649	674	699	724	749
425	450	475	500	525	550	575	600	625	650	675	700	725	750

751	761	771	781	791	801	811	821	831	841	851	861		
752	762	772	782	792	802	812	822	832	842	852	862		
753	763	773	783	793	803	813	823	833	843	853	863		
754	764	774	784	794	804	814	824	834	844	854	864		
755	765	775	785	795	805	815	825	835	845	855	865		
756	766	776	786	796	806	816	826	836	846	856	866		
757	767	777	787	797	807	817	827	837	847	857	867		
758	768	778	788	798	808	818	828	838	848	858	868		
759	769	779	789	799	809	819	829	839	849	859	869		
760	770	780	790	800	810	820	830	840	850	860	870		

NAME .....

POSITION .....

FIRM .....

STREET .....

CITY ..... ZONE.....

STATE .....

PRODUCT MANUFACTURED .....

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draft ventilation. A waffle-type floor permits rapid removal of abrasive from the room. Abrasive is removed by the air that ventilates the room, is air washed and returned to the continuous blast generator in a closed system.

459. Plastic Steel

Devcon Corp., Danvers, Mass.—Application bulletin No. 1 details the materials procedures and suggestions for use of four materials usable in the foundry industry for making patterns, coreboxes, molds and duplicates of wood and metal patterns; repairing and altering wood and metal patterns, coreboxes and gates; making blow boxes, shell molds or driers or filling large or small holes in castings.

460. Resinoid Wheels

Bay State Abrasive Products Co., Westboro, Mass.—Catalog of reinforced resinoid abrasive products presents general information, use, advantages, cutting characteristics and recommended specifications for raised hub disc wheel, abrasive cut-off wheels and resinoid straight wheels.

461. Fume Collection

Wheelabrator Corp., 1103 South Byrkit St., Mishawaka, Ind.—Installation photographs, equipment and methods for preventing atmospheric pollution by fumes from electric steel melting furnaces are found in bulletin 553-D.

462. Vibrator

Martin Engineering Co., Neponset, Ill.—Specifications, performance data, mounting suggestions and general information on an all-directional, high-speed vibrator for movement of granular material are offered in catalog.

463. Air Compressors

Kellogg Division, American Brake Shoe Co., Rochester 9, N. Y.—Catalog covers line of 1/3 to 20 hp air compressors for industrial and automotive use. Specifications on single and two-stage models, portable models, tanks, pumps and accessories are also included as is information on compressed air.

464. Electric Furnaces

Ajax Engineering Corp., Trenton, N. J.—Folder E356 contains dimensions, engineering data and general information on Ajax-Tama-Wyatt furnaces designed for melting and holding metals in die casting, permanent mold and sand casting foundries.

465. Alkalies and Chemicals

Solvay Process Division, Allied Chemical & Dye Corp., Dept. PB, 61 Broadway, New York 6, N. Y.—Book contains detailed information on the entire line of Solvay alkalies and chemicals. A listing groups the products by consuming industries or manufacturing processes.

466. Combustion Safeguards

Selas Corp. of America, Dresher, Pa.—Bulletin SC-1006 describes the operation and construction of Fire Checks which detect, localize and extinguish flashback in a mixture supply line and Safety Blowouts which prevent flashback and relieve excessive flashback pressure in combustible mixture main supply piping.

467. Electric Motor

Reliance Electric & Engineering Co., 1088 Ivanhoe Rd., Cleveland 10, O.—Bulletin B-2501 shows a cutaway view of a totally-protected electric motor for industrial use. The alternating current motor is designed for applications requiring dripproof or splashproof motors and is guaranteed to operate within a maximum temperature rise of 40° C.

468. High-Heat Paint

Chem Industrial Co., 3784 Ridge Rd., Brooklyn 9, O.—Form LL-4235 covers pertinent information on high heat aluminum paint capable of withstanding temperatures up to 1700°F without blistering or burning. It is said to be ideal for painting heat lines, condensers, ovens, compressors, etc.

469. Cupola Dust Control

American Air Filter Co., 215 Central Ave., Louisville 8, Ky.—Bulletin 292 describes the operation of Amerclone, a dry centrifugal dust separation system designed to handle large exhaust volumes of granular dust such as found in cupolas or boiler stacks.

470. Masonry Saw

Clipper Mfg. Co., 2800 Warwick, Kansas City 8, Mo.—Photographs, operating features, performance data and general information on company's SuperMatic masonry saw is covered in form 2017.

471. Chisels

Bedford Tool & Forge Co., Bedford, O.—Catalog standardizes pneumatic and hand chisels by point style, body

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size and shank type. Twelve point styles are listed for each body size and collar type, with dimensional detail shown by line illustrations. Data on tool reconditioning methods also is provided.

472. Pneumatic Controllers

Minneapolis-Honeywell Regulator Co., Industrial Division, Wayne & Windrim Aves., Philadelphia 44, Pa. —Catalog C 600/700—1 describes Brown small-case indicating pneumatic controllers for temperature and pressure ranges between 0 to 1000° F and 0 to 1000, respectively. Measuring accuracy is said to be ± 1 per cent of full scale.

473. Graphite Refractories

Mexico Refractories Co., Mexico, Mo.—Booklet describes Helspot, a graphite refractory available in plastic form, bricks or dry for use as mortar, ladle wash coatings or for casting shapes on the job. The refractory has applications in iron and steel foundries and steel mills.

474. Shear Pin Sprockets

Link-Belt Co., Dept. PR, Prudential Plaza, Chicago 1, Ill.—Folder 2749 gives detailed information and tables listing stock sizes, torque ratings, hub dimensions and key seats for roller chain shear pin sprockets available from stock.

475. Industrial Lighting

Sylvania Electric Products Inc., Wheeling, W. Va.—Booklet, "Prescribed Lighting Protects the Eyes of Industry," stresses plant lighting as an important tool for increased production and lists ten advantages to be gained from improved lighting.

476. Material Handling

Allis-Chalmers Mfg. Co., Materials Handling Division, Milwaukee 1, Wis. —Design, engineering, construction and operating features of fork lift trucks, towing tractors and platform trucks are found in catalog BU-305. Dimensions and specifications of each unit are included.

477. Strain Gages

Electronics and Instrumentation Division, Dept. SO 59, Baldwin-Lima-Hamilton Corp., Waltham, Mass.—Prices list on SR-4 strain gages, instruments and accessories also contains a discussion of gages and methods of using them. Selection data also are included.

478. Material Handling

Nutting Truck & Caster Co., 1201 West Division St., Faribault, Minn. —Booklet 57-S illustrates trailers, drag-line trucks, dollies, jacks and skids, wagon trucks, barrel handling equipment, 27 different models of 2 and 4-wheel trucks plus a variety of casters and special duty trucks.

479. Industrial Exhibits

Poirot Exhibitors Service Inc., 2001 West Pershing Rd., Chicago 9, Ill.—Booklet details the scope of the firm's activities in erecting, maintaining, dismantling, shipping and storing industrial trade show exhibits.

480. Epoxy Laminations

Smooth-On Mfg. Co., 572 Communipaw Ave., Jersey City 4, N. J.—Bulletin TB22 describes the complete process for making glass-laminated epoxy resin impressions for use in metalworking and model and pattern reproducing. Suggestions for handling, mixing, weighing and care of tools and brushes also are included.

481. Insulating Materials

Baldwin-Hill Co., Engineering Dept., 500 Breunig Ave., Trenton 2, N. J.—Specifications, material characteristics, typical applications and application instructions of spun mineral wool industrial insulating products are offered in catalog.

482. Chaplets

Canton Chaplet & Chill Division, W. L. Jenkins Co., 1445 Whipple Rd., S.W., Canton, O.—Catalog offers general information on wide variety of styles and sizes of foundry chaplets. Special chaplets can be supplied.

483. Magnet Controllers

Ohio Electric Mfg. Co., 5400 Dunham Rd., Maple Heights, Cleveland, O.—Typical applications, schematic

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405	430	455	480	505	530	555	580	605	630	655	680	705	730
406	431	456	481	506	531	556	581	606	631	656	681	706	731
407	432	457	582	507	532	557	582	607	632	657	682	707	732
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409	434	459	484	509	534	559	584	609	634	659	684	709	734
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417	442	467	492	517	542	567	592	617	642	667	692	717	742
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419	444	469	494	519	544	569	594	619	644	669	694	719	744
420	445	470	495	520	545	570	595	620	645	670	695	720	745
421	446	471	496	521	546	571	596	621	646	671	696	721	746
422	447	472	497	522	547	572	597	622	647	672	697	722	747
423	448	473	498	523	548	573	598	623	648	673	698	723	748
424	449	474	499	524	549	574	599	624	649	674	699	724	749
425	450	475	500	525	550	575	600	625	650	675	700	725	750
751	761	771	781	791	801	811	821	831	841	851	861		
752	762	772	782	792	802	812	822	832	842	852	862		
753	763	773	783	793	803	813	823	833	843	853	863		
754	764	774	784	794	804	814	824	834	844	854	864		
755	765	775	785	795	805	815	825	835	845	855	865		
756	766	776	786	796	806	816	826	836	846	856	866		
757	767	777	787	797	807	817	827	837	847	857	867		
758	768	778	788	798	808	818	828	838	848	858	868		
759	769	779	789	799	809	819	829	839	849	859	869		
760	770	780	790	800	810	820	830	840	850	860	870		

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wiring diagrams and over-all dimensions of pushbutton and lever type magnet controllers for operating 45 to 80-in. lifting magnets are provided in bulletin MC-143.

484. Optical Instruments

Bausch & Lomb Optical Co., 635 St. Paul St., Rochester, N. Y.—Booklet, "Industrial Optical Aids," contains information on a wide assortment of precision optical instruments and suggests ways to use them to gain fast, easy, low-cost production. Items discussed include magnifiers, microscopes, wide field tubes, macroscopes and comparators.

485. Vacuum Chambers

Leader Welding & Mfg. Co., 2418 Sixth St., Berkeley 2, Calif.—Bulletin highlights controlled atmosphere vacuum chambers with matched vacuum pumping units, instrumentation and controls and various accessories and attachments available for controlled atmosphere welding and metallurgical research.

486. Conversion Chart

Moeller Instrument Co., Richmond Hill 18, N. Y.—Temperature conversion chart is pocket size and contains easy-to-read tables of Fahrenheit and Centigrade temperature equivalents. The chart is available without obligation to engineers, students and others having use for it.

487. Electric Hoists

Chisholm-Moore Hoist Division, Columbus McKinnon Chain Corp., 174 Fremont St., Tonawanda, N. Y.—Illustrations, descriptions and basic specifications of CM hand and electric hoists and related overhead material handling equipment is included in pocket-size circular 163.

488. Zirconium

Carborundum Metals Co., Division of Carborundum Co., Akron, N. Y.—Vol. 1, No. 1, *More Zr Facts,* gives historical data and features a story on zirconium production processes at Carborundum Metals. Subsequent issues will treat corrosion resistance, nuclear properties, physical and mechanical properties, analytical methods and fabrication techniques of zirconium.

489. Power Tools

Boice-Crane Co., 907 West Central Ave., Toledo 6, O.—Details, specifications and illustrations of band saws, contour saws, band filers, cutters, shapers, drill presses, tool and knife grinders, jig saws, jointers, lathes, planers, belt and spindle sanders, saw jointers, shapers and spinning tools are found in catalog.

490. Tubing and Fittings

H-P Products Inc., Louisville, O.—Bulletin V-157 contains specifications and general application information on steel tubing and fittings for vacuum systems and conveying lines carrying liquids, gases or airborne solids.

491. Air Compressors

Brunner Mfg. Co., 11 Fisher St., Utica, N. Y.—Data sheet 653R lists construction details, specifications and models of air compressors in the ¼ to 20 hp range. Selection data to assist in choosing the right compressor for a specific job also are provided.

492. Heat Treating

Surface Combustion Corp., Toledo 1, O.—Vol. 7, No. 3, *Heat Treat Review,* presents an article on modern quenching techniques, motor parts production using a versatile oven furnace with a new firing system and cam-actuated program control and fast aluminum melting for castings using a newly designed dry-hearth furnace.

FOUNDRY Reprints

493. Automatic Casting

Automatic Casting of Aluminum Employs Continuous Melting by Jack C. Miske details operating features of a new type aluminum melting furnace that provides a continuous supply of metal to an automatic pouring unit. Molds on turntables are indexed to a position under the pouring ladle.

494. Investment Castings

Things To Watch in Producing Sound Investment Castings by C. W. Schwartz diagnoses causes of defects found by visual inspection of rough investment castings and suggests what to do to correct these defects.

495. Shell Molding

Shell Molding at Lynchburg by Robert H. Herrmann highlights a mechanized, high-production, jobbing shop making gray and ductile iron castings. The foundry is one of the first designed, built and operated solely to make shell mold castings.

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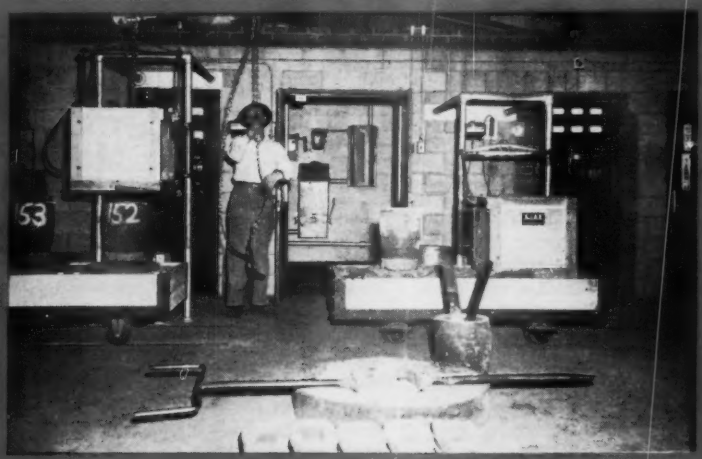
Now with Crucibles, foundries are melting 240 lbs. of bronze in seventeen minutes or fourteen pounds per minute!

The illustration shows the cleanliness and efficiency obtainable with Crucible furnaces.

Comparable results are achieved with other fuels generally available for Crucible melting.

Have you seen the new "'CRUCIBLE CHARLIE' says . ." leaflets issued by Crucible Manufacturers Association? If not, ask your superintendent about this. He has a copy.



Installation of Electric Induction Crucible Furnaces at Wollaston Brass and Aluminum Foundry, North Quincy, Mass. consists of two No. 80 Crucible furnaces lift coil type and one tilting Crucible furnace (not shown) 800 lbs. bronze capacity. Illustration shows method of alternate use of Crucibles by lifting the furnace coil and replacing full hot Crucible with cold Crucible already charged.

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JOSEPH DIXON CRUCIBLE CO.

Circle 707 on Inquiry Card—Page 225

New Equipment and Supplies

Shipping Containers

reportedly speed car unloading time by as much as 90 per cent

Olin Mathieson Chemical Corp., 460 Park Ave., New York 22, N. Y. —Purite fused soda ash for foundry use is shipped in nonreturnable, specially-designed pallet boxes said to reduce car unloading time as much as 90 per cent compared with bag and bulk shipments. The boxes, of open top wooden construction with wire binding reinforcement, hold 700 lb each. A special pallet bottom permits easy handling, either singly or two at a time, by standard fork lift trucks. In storage, the full boxes may be stacked four high without crushing or buckling. Purite, for fluxing, desulphurizing and refining ferrous and nonferrous metals, will continue to be available in 100-lb burlap bags and bulk, as well as in the new pallet boxes.

For More Details Circle No. 401—Page 225

High-Temperature Alloy

for investment castings has some outstanding properties

Haynes Stellite Co., Division of Union Carbide & Carbon Corp., 30 East 42nd St., New York 17, N. Y.—GMR-235 is a nickel-base, high-temperature alloy containing chromium, molybdenum, iron and boron with aluminum and titanium as precipitation-hardening agents. It is produced both by air melting and vacuum melting techniques. The alloy was designed for investment cast turbine wheels, buckets and vanes for use at temperatures in excess of 1400° F. The air-melted alloy is produced to a minimum specification of 75 hr at 35,000 psi stress-to-rupture at 1500° F, with a minimum elongation at rupture of 5 per cent. Vacuum melted GMR-235 is capable of meeting a minimum of 60 hr at 28,000 psi stress-to-rupture at 1600° F, with a minimum elongation at rupture of 10 per cent. Vacuum-melted alloy GMR-235D is produced to a specification of 120 hr at 28,000 psi stress-to-rupture at 1600° F with minimum elongation at rupture of 8 per cent.

For More Details Circle No. 402—Page 225

Rotating Tilter

facilitates cleaning of carbon block molds

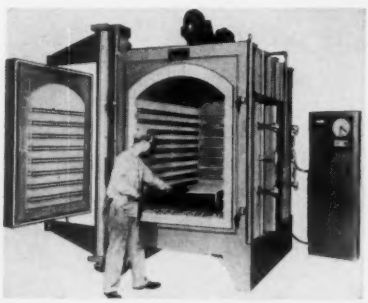
Logan Co., 200 Cable St., Louisville 6, Ky.—Rotating tilter facilitates cleaning of carbon block molds weighing up to 3500 lb in a foundry of a nationally known producer of railroad car wheels. Incoming cope is received from connecting conveyor. Signal rolls then center the cope on a chain-driven roller bed and activate air-operated hold-down section. Operator rotates the unit, through push-button controls, to desired position for cleaning top side of cope. He may rotate unit in opposite direction to a position for cleaning other side. When cleaning is completed, unit is rotated back to its original position, hold-down section released and cope advanced through the tilter and discharged onto the connecting conveyor.

For More Details Circle No. 403—Page 225

Convection Furnaces

are designed for a variety of industrial heating operations

L & L Mfg. Co., 136 Eighth St., Upland 86, Delaware County, Pa.—Forced convection furnaces for aluminum brazing, tempering, normalizing, hardening and other operations with and without protective and special atmospheres have a heat range from 250 to 1875°F. Sizes vary from 13 x 13 x 25 in. deep to 36 x 40 x 72 in. deep in 15 standard models. Special sizes also are made. Furnaces are available with vertical lift or horizontal opening doors. Close gradients are maintained automatically by fans that circulate the atmosphere in the firing chamber.



For More Details Circle No. 404—Page 225

Stopper Head

for huge ladles promises to reduce pouring accidents

Electro Refractories & Abrasives Corp., 344 Delaware Ave., Buffalo 2, N. Y.—Stopper head for huge ladles promises to reduce pouring accidents in steel mills and prevent costly metal spillage. The stopper head reportedly can regulate the flow of molten steel as many as 50 times during a single heat without showing signs of cracking from heat shock. The stopper is made from flake graphite, fused silica and fired refractory clay. For operating temperatures above the normal 2900°F, aluminum oxide is added to the mixture.

For More Details Circle No. 405—Page 225

For More Details on These Items
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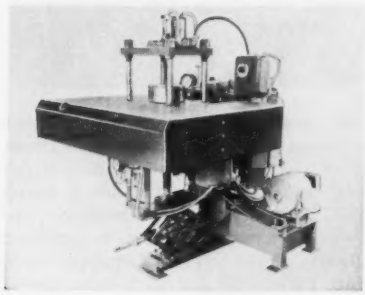


Wax Injection Presses

makes possible semiautomatic production of wax patterns

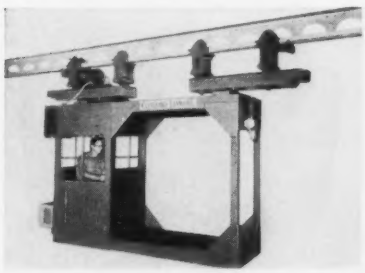
Alexander Saunders & Co., 95 Bedford St., New York 14, N. Y.—Semiautomatic production of wax patterns for investment casting is possible through a mechanical die closing press designed for use on Sherwood wax injection presses, models WP-24 and WP-53. Press operates from the horizontal nozzle of the wax injection press. Platens will accommodate dies of varying size to 6 in. in height and 12 in. square. The press withstands injection pressures of 600 psi up to 50 sq in of wax surface in the plane of the parting line of the die parallel to the platen. Sequence controls operate on 110 v, 60 cycle, single phase, alternating current.

For More Details Circle No. 406—Page 225

Tramrail Carrier

is air conditioned to keep the operator comfortably cool

Cleveland Tramrail Division, Cleveland Crane & Engineering Co., Wickliffe, O.—Carrier for operation on overhead tramrail systems to carry ladles of hot metal is air conditioned to keep the operator comfortably cool. The cab is enclosed with aluminum paneling and the door has a safety switch that prevents the carrier from being moved when the door is open. The unit has a capacity of 3100 lb and travels at speeds up to 300 fpm. Carriers of other capacities and speeds can be furnished.



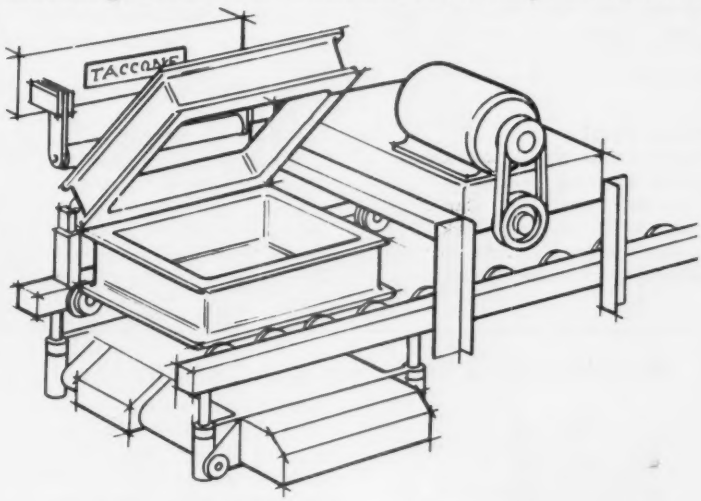
For More Details Circle No. 407—Page 225

Die Casting Accessory

is for removing castings from die casting machines

Osborn Mfg. Corp., Warsaw, Ind.—Tool for removing die castings from the die is designed so that the cone-shaped head will fit a wide range of sizes. A hardened steel plunger actuated by a lever on the handle, grips the sprue securely with a minimum of leverage applied by the operator. Relaxing pressure on the lever instantly releases the tool from the casting. The tool, called a Sprue-

Molding Machines Contain New Improvements



UPSET STRIKE-OFF auxiliary equipment on the Taccone Diaform molding machine reportedly makes possible the use of shallower, more flexible tight flasks than on previous models.

Other improvements in the machines include outboard stripping pins to provide maximum versatility of flask size; prepack roller to virtually eliminate spill sand automatically without danger of ram-offs; double injection valve and higher power suction to give faster air flow in and out of diaphragm head for maximum speed; outboard oil cushion to provide better shock absorption of traverse car movement and reduce molding cycle time; a strip mechanism enclosed in a sealed oil bath to assure accurate stripping with minimum maintenance; drawer type masking frame to permit quick flask size change for short-run or jobbing operations and a quick-change tank to permit rapid replacement of diaphragm.

All models of the diaphragm machines are available with full automation, semiautomation or electrified manual operation permitting a completed molding cycle in as little as seven seconds. All models are available with built-in automatic flask filling and indexing equipment. The machines are sold by Eastern Clay Products Dept., International Minerals & Chemical Corp., 20 North Wacker Dr., Chicago 6, Ill.

For More Details Circle No. 444—Page 225

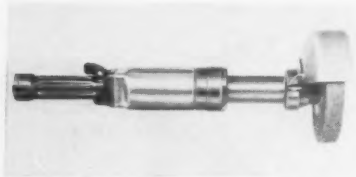
master, is available in 10 and 15-in. shaft sizes for either right or left-hand feed. All parts are interchangeable and easy to replace.

For More Details Circle No. 408—Page 225

Air Grinder

is said to be more powerful than previous models

Thor Power Tool Co., Aurora, Ill.—Lightweight air grinders feature an improved motor that is a reported 50 per cent more powerful than previous models. Thor series 4G grinders are made in 12 models, four different speeds and three different throttle types. Model is available in



speeds of 4500, 6000, 9000 and 12,000 rpm with butterfly, grip and lever type handles. Throttle valve seats in steel bushings are made of stainless steel to prevent rusting.

For More Details Circle No. 409—Page 225

Electric Hoist

provides fast lifting and slow, gentle lowering speeds

American Chain & Cable Co., Wright Hoist Division, York, Pa.—Two-speed electric hoists featuring fractional horsepower 1800/450 rpm motors reportedly provide fast lifting and lowering speed and a slow ¼ normal speed for gentle positioning of production work. These Frame 1 hoists are available in parallel, cross, hook, rigid or bolt mountings. Totally enclosed NEMA specification motors operate on ac or dc. Automatic brakes, immersed in an oil bath, assure uniform operation in varied atmospheres and safe holding of load while in suspension.

For More Details Circle No. 410—Page 225

Small Truck

can carry loads up to 3500 lb at speeds up to 15 mph

Getman Brothers, South Haven, Mich.—Small truck with caster steering turns in its own length and can carry loads up to 3500 lb at speeds up to 15 mph. The truck, called the Getman Scoot-Crete, has power to climb grades up to 25 degrees. A locking brake lever holds the truck immobile when applied. Ruggedly built, with forward and reverse speeds, with Wisconsin gasoline or Deutz air-cooled Diesel engines it can be used in indoor or outdoor applications.

For More Details Circle No. 411—Page 225

Paddle-Type Mixer

uniformly coats a 400-lb batch of sand in 5 minutes

Speed King Mfg. Co., division of Jaeger Machine Co., Columbus, O.—Paddle-type machine for mixing core sand is reported to save up to 25

per cent on the amount of core oil used and to eliminate weak cores. The four, three-bladed paddles of the unit are said to coat a 400-lb batch of sand uniformly in 5 minutes, and eight or nine batches can be produced hourly. The mixer is equipped with electric motor and shift-lever power engagement.

For More Details Circle No. 412—Page 225

Rust Preventive Oil

provides three-way corrosion protection to all metals

Octagon Process Inc., 20 Bank St., Staten Island 1, N. Y.—Froil, a corrosion-protective oil, is claimed to provide three-way protection: A moisture and vaporproof barrier against corrosion, water displacing properties and fingerprint removal. Manufacturer says it is ideal for protecting precision parts, castings, dies, tools, gages and highly machined parts during their manufacture, storage and shipment. Used after water cooling or testing, it eliminates spotting. Applications may be made by brushing or wiping, by dip immersing or spraying.

For More Details Circle No. 413—Page 225

Wire Mesh Container

has been developed for heavy parts handling

Springport Steel Products Co., Springport, Mich.—Heavy-duty model 400 wire mesh container is designed for heavy parts handling in production, warehousing or in transit.

Claimed advantages are visual inventory at all times, no warpage, can be stored outside without collecting water, no debris collection and minimized repair. Containers can

New Molder's Shoe Has Air Cushion Insole

EXTRA FOOT comfort that results in greater efficiency is said to be provided in a new molder's shoe that incorporates an air cushion insole from heel to toe with a built-in pad that supports the metatarsal arch and a longitudinal arch support.

The air cushion insole is a one-piece resilient cushion covered full length by one piece of leather. These rubber cushions absorb most of the impact of walking and provide a comfortable cushion to stand on. The cushioned longitudinal arch support is a part of the cushion insole and provides a restful support from the heel to the ball of the foot. The metatarsal pad, also built into the cushion insole, supports the transverse arch to help prevent callouses.

Another comfort feature is a steel toe box designed to prevent the back edge of the box from pinching the toes. The long base of this box forces the shoe to break back of the top edge in walking. This prevents pinching and gives added protection against injury should a heavy blow collapse the top of the box. The shoes are made on special lasts to eliminate the boxy appearance common to some safety shoes. Shoes are made by the Bronson Shoe Co., 710 West Lake St., Minneapolis 8, Minn.

For More Details Circle No. 445—Page 225

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Circle 708 on Inquiry Card—Page 225

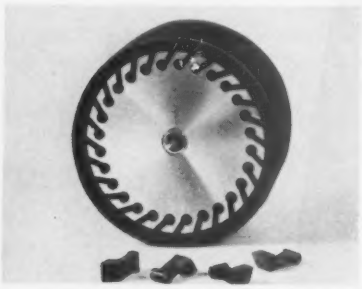
hold up to 6000 lb of material and can be stacked four-high when loaded to capacity. Various sizes can be furnished.

For More Details Circle No. 414—Page 225

Grinding Wheel

of expandable type has interchangeable segments

Nu-Matic Grinders Inc., 8224 Carnegie Ave., Cleveland 3, O.—A series of separate, replaceable rubber segments grip the coated abrasive and



form the grinding surface of the Flexcore grinding wheel. The wheel is designed so that complete peripheral contact is made with the coated abrasive band. The manufacturer reports this feature provides greater holding power on the abrasive band so that the wheel can be operated at much slower speeds than possible with conventional expanding wheels. Wheel diameters of 3, 4, 5 and 6 in. are made. Widths are made to any specification. Standard segments are made to full width of the wheel, but fractional size segments can be provided.

For More Details Circle No. 415—Page 225

Wall-Mounted Pyrometer

can be attached quickly to any instrument board or wall

Illinois Testing Laboratories Inc., 420 North LaSalle St., Chicago 10, Ill.—Type R-4200 pyrometer combines the convenience of a portable and the instrument protection of a wall-mounted unit. Bold numerals and sharp graduations make the large 5-in. scale easy to read. Available with flexible arm and choice of ten thermocouples in standard ranges from 0-300 to 0-2000°F. Steel case is magnetically shielded.

For More Details Circle No. 416—Page 225

Welding Goggles

can be worn comfortably over a welder's personal glasses

Sellstrom Mfg. Co., Palatine, Ill.—"Jumbo size" welding goggles are large enough to be worn comfortably

over the welder's personal glasses. Eye cups are of thermosetting plastic and are claimed to provide good ventilation around the eyes. Two styles are available—one with an adjustable bridge for extra close fit and the other with a bridge brace bar joining both eye cups so its wearer can raise the goggle with one hand.

For More Details Circle No. 417—Page 225

Plumber's Flushing Gun

uses water impact and air pressure to clean clogged pipes

Miller Sewer Rod Co., 4642 North Central Ave., Chicago 30, Ill.—Plumber's flushing gun will clean all pipelines of grease, rags, sand, scale and other obstructions at distances up to 100 ft. The unit uses water impact and air pressure to cause a chain reaction throughout the line and move obstructions. There is no need to remove pipeline, strainer or grease trap. Pipes with diameters from ½ to 6 in. can be cleared with one or more shots from the gun.

For More Details Circle No. 418—Page 225

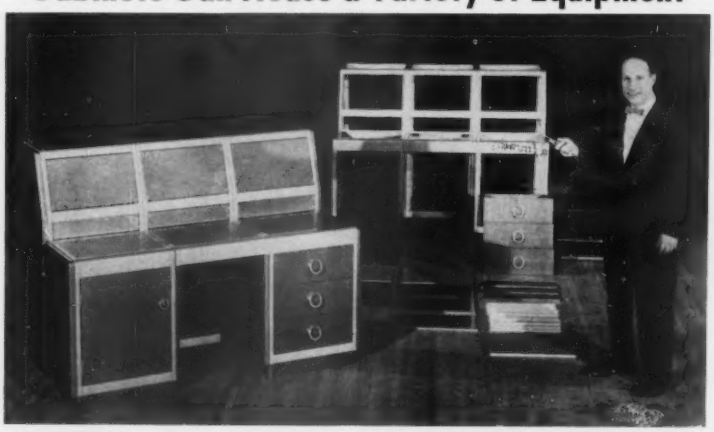
Truck-Mounted Crane

will lift 15 tons at 10 ft radius with a 30 ft boom

Coles Cranes Inc., Joliet, Ill.—Model L-1510 truck-mounted crane will lift 15 tons at 10-ft radius with a 30-ft boom and is mounted on a spe-

cially engineered crane carrier. Basic design of the superstructure follows the Coles gas or diesel-electric principles. Two-line hoisting is available and each line can be operated independently from a separate drum.

Cabinets Can House a Variety of Equipment



MODULAR enclosure system offers industry a wide variety of cabinets which can be constructed from 75 standard "building block" components and 125 sub-parts. Product and design engineers can now create enclosure systems for housing instrumentation, automation, control and electronics equipment or other company needs. Modular units are factory subassembled and the units are bolted together to form a finished cabinet. A Phillips head screwdriver, Tinnerman fasteners and screws are supplied with each unit and these are the only tools required to put the assembled components together. Cabinets are made of cold rolled heavy gage steel and finished in a two-tone gray baked enamel with a Bonderite base. Other special colors as well as unpainted cabinets can be furnished. Manufactured by Elgin Metalformers Corp., 30 Congdon Ave., Elgin, Ill.

For More Details Circle No. 446—Page 225

HARDEN CORES
in 3 seconds
by the magic of the
CO_2 PROCESS
using STEINEX*

STEINEX

*STEINEX, the original CO_2 Sand Binder, is the standard of *quality and comparison* throughout the world. Hardens fast, produces harder cores, less gas evolution and better shake-out. No other binder can compare with it in quality. Made in seven grades to meet the customers specific requirements.

Ask for HANDBOOK on the CO_2 PROCESS

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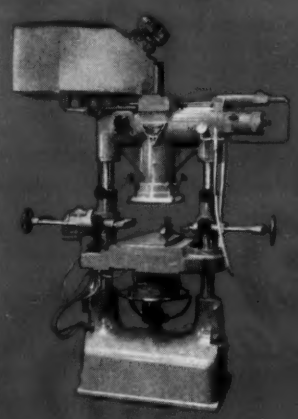
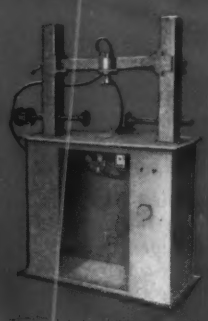
Complete Suppliers for the CO_2 PROCESS

Everything you need for the CO_2 PROCESS



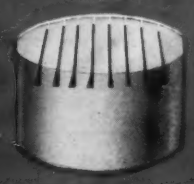
V + S
CORE SHOOTER



CARVER AUTOMATIC
GASSING APPARATUS

FORMLAC CORE and MOLD WASH
puts a hard coat on CO_2 cores that tremendously improves handleability. High refractory properties assure against burn-in on any size casting. Wonderful to stiffen up long, delicate or thin cores.

V + S RAPID
SAND MIXER



Self-Cleaning, Taper-Slot
CORE VENTS

Circle 709 on Inquiry Card—Page 225

"Edco Bottom Boards are permanent equipment in our foundry"

. . . says Olney Foundry, Link-Belt Co., Philadelphia, Pa.

Like other modern mechanized foundries, Olney has come to rely on the durability of Edco Dowmetal Bottom Boards. After 3 years of day-in, day-out use, Edco Boards are still giving maximum production efficiency.

Read what Olney says: "Burning and breakage loss isn't a factor since using Edco Boards. They've helped increase output while cutting production costs and have more than paid for themselves in savings alone effected by substantially reduced replacement costs. Edco Dowmetal Bottom Boards are permanent equipment in our foundry."

Edco Boards help produce castings true to pattern too. Exclusive groove and vented design permits escape of gasses; insures mold stability. Causes for rejects are minimized.

Molders in small, medium and large foundries of all types like handling Edco Dowmetal Boards because they're light (yet strong), stack easily, won't splinter—no breaks, splits or upkeep to worry about. *Your* foundry should be using Edco Dowmetal Bottom Boards.

Write for your free copy of the New Facts File. There's no obligation.

CHRISTIANSEN CORPORATION

210 S. Marion Street • Oak Park 1, Illinois

Phones: MA 6-7330 or EU 3-5050

EDCO DOWMETAL BOTTOM BOARDS
EDCO ALUMINUM CORE PLATES

Please send Facts File including list of 83 standard sizes available from stock.

Name_____

Company_____

Address_____

City-Zone-State_____

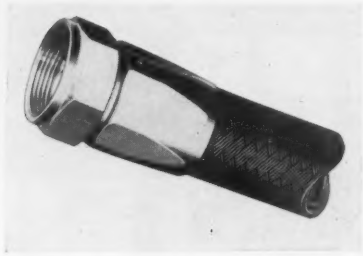
Circle 710 on Inquiry Card—Page 225

Both drums may be operated simultaneously and are equipped for power or gravity operation. Boom lengths up to 75 ft can be supplied.
For More Details Circle No. 419—Page 225

Reusable Hose Ends

are suited for medium high pressure applications

Weatherhead Co., Fort Wayne Division, Fort Wayne, Ind.—Model H-69 reusable hose ends are used where medium-high-pressure, cotton-covered,

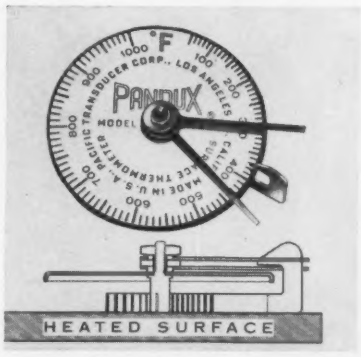


single wire braid hose is required. Design permits close coupling. Threads match SAE and JIC standards. The line meets most all requirements as original equipment or for field installations in air, fuel, hydraulic, grease and oil lines, LP-gas transfer lines and transfer equipment and material handling equipment. Various sizes are available.
For More Details Circle No. 420—Page 225

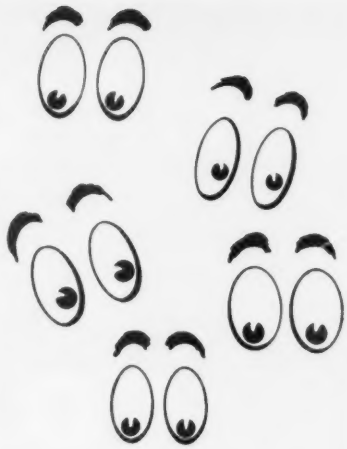
Surface Thermometer

of stainless steel has a range from 50 to 1000°F

Pacific Transducer Corp., 11836 West Pico Blvd., Los Angeles 64, Calif.—Stainless steel maximum-minimum surface temperature thermometer has a range from 50 to 1000°F and features two ancillary pointers



which show the maximum and minimum excursions of the thermometer over any desired period of time. The pointers can be reset whenever a reading is taken. Besides surface temperatures, it provides also a record of temperatures in furnaces, ovens and other enclosed spaces, as well as liquids and gases. An Alnico



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the numerous types of headings under which classified ads are listed? Whether interested in obtaining qualified personnel, selling used machinery, wanting to buy equipment, or are yourself looking for a better position, you should seriously consider advertising in the classified section of FOUNDRY MAGAZINE.

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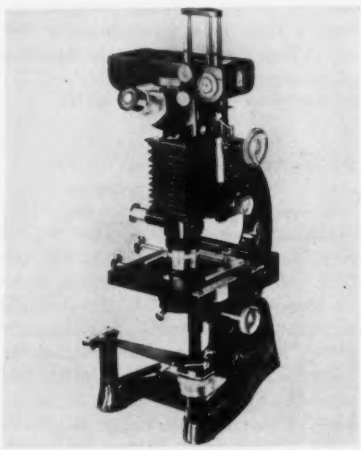
magnet is provided for attachment to ferrous surfaces when the thermometer is used in a vertical position.

For More Data Is Circle No. 421—Page 225

Reflecting Microscope

can be used for metallurgical investigations in visible light

Ealing Corp., Natick 3, Mass.—Reflecting objective microscope for work in visible, ultraviolet and infrared light has an optical system made up of mirrors to eliminate chromatic aberration. Exceptionally long working distance of the objective (x15 24mm) makes the instrument valuable for work on microfurnaces as well as for metallurgical investigations in visible light, according to



the manufacturer. For work requiring high resolution coupled with a long working distance, a special x36 objective is provided. It is a medium power system with the resolving power normally associated with an 8-mm refracting objective.

For More Details Circle No. 422—Page 225

Speed Control Valve

is designed for ease of adjustment and maintenance

Ross Operating Valve Co., 120 East Goldengate Ave., Detroit 3, Mich.—Speed control valve with a screw drive slot for ease of adjustment and maintenance provides split-second timing of piston movement by positive control of air flow. It also is supplied with regular knob adjustment or pin lever adjustment. Valve can be mounted in any position, at either or both ends of a cylinder.

For More Details Circle No. 423—Page 225

Platform Truck

is of the end-control, stand-up, nontelescopic type

Elwell-Parker Electric Co., 4205 St. Clair Ave., Cleveland 3, O.—Platform truck of the end-control, stand-up, nontelescopic type features two-

BECKER

CARBORISE

(artificial graphite)

A DEPENDABLE, LOW-COST ADDITIVE TO INCREASE CARBON CONTENT...

of uniform quality and carefully controlled mesh to meet your specifications.

"....everything in carbon"

BECKER BROTHERS CARBON CO.

3450 S. LARAMIE AVE. • CICERO 50, ILLINOIS

Circle 711 on Inquiry Card—Page 225

For Normalizing, Annealing and Stress Relieving

JOHNSTON CAR BOTTOM FURNACES

Engineering experience is apparent in the smooth operation of the Johnston Car Bottom Furnace. Roller bearings in car and door hoist shafts, mechanical car seals, and power operated car pullers are just a few of many practical features. Johnston "Reverse Blast" low pressure burners for oil or gas assure clean, economical, efficient heat for annealing, normalizing, and stress relieving.

Write for Bulletin F-240

Johnston Equipment for the Foundry
● Melting Furnaces ● Heating Torches ● Ladle Heaters
● Heat Treating Furnaces ● Burners, Blowers, Controllers
Over Thirty Years Experience in Design and Manufacture.

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ENGINEERS & MANUFACTURERS OF INDUSTRIAL HEATING EQUIPMENT

Circle 712 on Inquiry Card—Page 225

HEAT

can't beat
this QUAKER
conveyor
belting!

It's Quaker's Kaloric — engineered to convey hot materials at temperatures of 350°F. and above.

All Quaker Kaloric belting is made with specially-developed compounds designed to give best resistance to heat. And Kaloric's special cover resists heat that causes ordinary belt covers to harden and crack. Skim coat between plies for insulation and extra flex-life.

Available in any length . any number of plies in widths up to 72″ . . . any cover thickness. Want extra safety, extra belt life? See your Quaker-Quaker Pioneer Rubber distributor today about Kaloric conveyor belting!

For more information write:
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Pittsburg, Calif.

HKP
QUAKER RUBBER DIVISION
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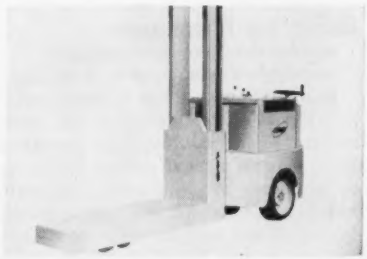
H. K. PORTER COMPANY, INC.

Circle 713 on Inquiry Card—Page 225

wheel drive and six-wheel steer. The frame is made of heavy steel plate formed and electrically welded. Center sill type construction is used with all major units attached directly to



the reinforced alloy steel bars which form the sills. A hydraulic lift cylinder operates the lift. A separate electric motor with an integral hydraulic gear type pump supplies the lift cylinder and the system operates at pressures below 12 psi.

For More Details Circle No. 424—Page 225

Air-Flow Switch

is a device which opens or closes an electrical circuit

Drying Systems Inc., 1800 Foster Ave., Chicago 40, Ill.—Model 955 airflow switch is a device which opens or closes an electrical circuit. It is actuated by the suction or pressure of an air duct and is mounted directly on the duct. The switch will operate on suction or pressure as low as 0.17 in. and up to 10 in. water gage. It can be used for any application where suction or pressure in an air duct is the motivating force and the opening or closing of an electric circuit is the required action.

For More Details Circle No. 425—Page 225

Lift Table

for assembly operations can lift up to 10,000 lb

Sage Equipment Co., 30 Essex St., Buffalo 13, N. Y.—Liftable is made in 5 and 10-ft lengths and widths up to 48 in. with capacities of 1000

to 10,000 lb. The unit is actuated by four air cylinders, operating on about 100 lb air pressure. When the Liftable is in the raised position, the load cannot move. When lowered, the load can move in any direction. The

unit may be inserted in a conveyor line or used separately. The model illustrated has a ball transfer base. A roller transfer base is available also.

For More Details Circle No. 426—Page 225

Winch Hoists

are said to be safe, speedy, lightweight and sturdy

Aluminum Products Inc., Box 1462, Fort Lauderdale, Fla.—Winch hoists of ½, 1½ and 2-ton capacity weigh 7½, 10 and 13½ lb, respectively, and can be used in a variety of industrial applications. Each is equipped with preformed aircraft wire rope having guaranteed breaking strengths be-

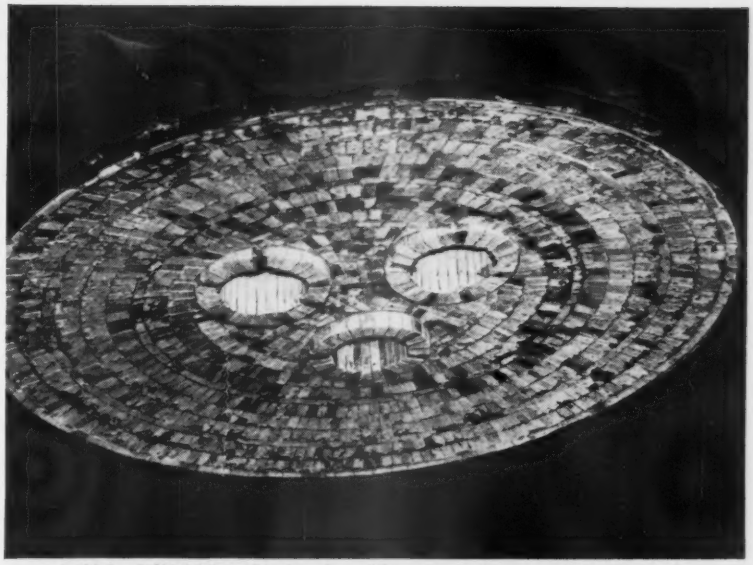
yond the capacity of the unit. The hoists have no clutches and no dangling chains and feature a handle that is safety-engineered to bend or break before the hoist can be severely overloaded.

For More Details Circle No. 427—Page 225

Radiant Tube Burner

for industrial use meets most indirect heating requirements

Eclipse Fuel Engineering Co., Rockford, Ill.—Gas burner assembly provides features designed to meet all but the most highly specialized designs for radiant tube indirect heating of industrial ovens, furnaces and muffles. They can be used as factory installed components of new equipment or for the modernization of existing installations. The "RT" burners can be installed directly on either metal or ceramic radiant tubes. Five series are available ranging in capacity from 250,000 to 625,000 Btu. Tube sizes vary from 4½ to 8⅝ in., maximum OD. A choice of mount-



An 18-ft. all-SHAMVA roof laid up for a 50-ton electric furnace melting alloy steels.

In electric furnace operations

SHAMVA MULLITE GIVES YOU OUTSTANDING SERVICE

"Shamva" Electric Furnace Roof Brick is a coarse and open type refractory, giving you the extreme spalling resistance necessary in top charge electric furnace roofs.

- *High fusion point (3335°F.)*
- *High softening point (over 3000°F.)*
- *Low coefficient of expansion (3.66 x 10^{-6} per °C.)*
- *Anti-spalling (0.7% at 3000°F. Preheat, A.S.T.M. test)*
- *High load bearing strength (—3.1%, at 3000°F., 1½ hrs., 25 p.s.i. A.S.T.M. test)*
- *Low heat conductivity for greater furnace efficiency*

With "Shamva" Mullite Brick, roof life and production increase, down time and labor costs decrease.

Let our field engineers assist in your refractory installation.

WRITE TO: *Mullite Works, Laclede-Christy Division, H. K. Porter Company, Inc., Shelton, Conn.*

Distributors in principal cities

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SLASH MELTING COSTS IN HALF!

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Furnaces...

NO CRUCIBLES USED!

Melt Brass, Aluminum, Iron in Half the Time, Use 66% Less Fuel Than Crucible Melting Furnaces.

- Revecon Furnaces operate on **2/3 less** fuel than used in crucible melting with gas or oil
- While no crucibles are used, metal is melted with minimum loss yet **special method of melting assures clean, castable metal**
- Waste heat from furnace preheats blast used
- De-oiling unnecessary in re-melting brass turnings into clean ingot
- Will melt small charges of iron —1½ gal. oil per 100 lbs. Iron hot and fluid—**ideal for alloy irons**

Revecon Furnaces represent another step forward by International Foundry Supply in procuring for you the best equipment available—anywhere!

For visual proof, demonstration units of the Revecon Furnace are being installed on our warehouse floor. For further information . . .

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INTERNATIONAL FOUNDRY SUPPLY CO.

"Best Obtainable Foundry Supplies and Equipment"

P. O. Box 1053
Reading, Pennsylvania
Telephone 6-0794

Circle 715 on Inquiry Card—Page 225

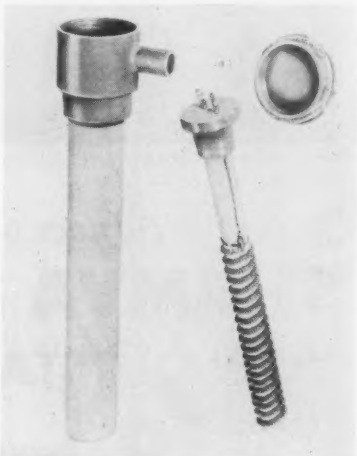
ing, air and gas regulation and ignition features adds to burner flexibility. Gas-pilot, spark or pilot-spark combination ignition is offered. Automatic controls are optional.

For More Details Circle No. 428—Page 225

Immersion Heater

replacement units have different kilowatt ranges

Pyrosil Inc., Cuyahoga Falls, O.—Replaceable heating elements for fused silica immersion heaters reportedly permit indefinite use of the quartz shell and acid-resistant boot and cap. Four interchangeable replacement sizes are available so that



different kilowatt ranges can be attained from the heaters. Replacement elements are guaranteed for one year or 6000 hr, whichever occurs first. Applications for the immersion heater include heatings of acids in pickling operations and melting waxes for investment casting processes.

For More Details Circle No. 429—Page 225

Colored Hardeners

reveal whether adequate epoxy resin mixing has taken place

Furane Plastics Inc., 4516 Brazil St., Los Angeles 39, Calif.—Colored safety hardeners for epoxy resins are said to fulfill important quality control functions in making it possible to add hardeners to an epoxy resin and determine from visual inspection whether or not mixing is thorough and adequate. Hardeners are nondermatitic and are offered with Epocast casting and laminating resins. Red, blue, yellow, green, orange, and black colors are available.

For More Details Circle No. 430—Page 225

Adjustable Hole Gage

features colored ends to speed identification

George Scherr Co., 200 Lafayette St., New York 12, N. Y.—Adjustable limit plug gage will check the bore diameter, as well as out-of-round-

When Accuracy Counts...

Depend on Three Way Alloy Control

- ***Quantometric***
- ***Spectrographic***
- ***Wet Chemical***

A complete, accurate and quick analyses service at surprisingly low cost covering:
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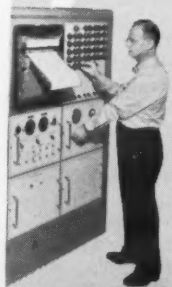
Cast Iron—Ductile Iron.
Our facilities are geared to handle routine daily control and occasional miscellaneous samples. Mailing envelopes furnished gratis for convenient sample transmittal.

Let us be another department of your company.

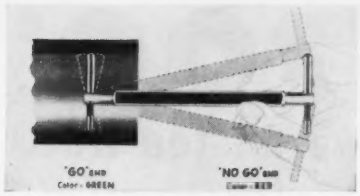


Teletype PG-544, Phone FRemont 1-5100 or Write today for complete information.

SPECTROCHEMICAL LABORATORIES, INC.

P. O. Box 8781, Pittsburgh 21, Pa.

Circle 716 on Inquiry Card—Page 225



ness and bell mouth in any spot and any depth, depending upon the length of the handle, up to about 5 in. A full set of gages will cover a range from 7/16 to 2 5/16 in. Single gages are available. For identification, the ends of the handles are colored. The "Go" end is green and the "No Go" end is red. The handle is stamped on each side with "Go" and "No Go."

For More Details Circle No. 431—Page 225

Portable Gas Torch

is a versatile tool that burns all types of gas

Hauck Mfg. Co., 124-136 Tenth St., Brooklyn 15, N. Y.—Portable torch for heating, melting, drying, lighting and thawing operations burns manufactured, mixed, natural, propane or butane gas. It operates with compressed air at 40 psi or more pressure. The torch lights instantly

without preheating. It generates heat of 2700°F and is unaffected by wind or weather. Flame size is adjustable. Five sizes are made. The smallest burner produces a flame 6 to 18 in. long, with a maximum heat release of 325,000 Btu, burning 1000 Btu gas. The largest burner produces a flame 10 to 48 in. long, with maximum heat release of 1,300,000 Btu per hr.

For More Details Circle No. 432—Page 225

Pilot Plant Furnaces

are for testing and determining proper methods and processes

Lindberg Engineering Co., Pilot Plant Equipment Division, 2450 West Hubbard St., Chicago 12, Ill.—Line of furnaces is designed for pilot plant operations requiring testing and determining proper methods and processes for heat treating and melting of metals. The new line covers six units: An atmosphere box furnace 5 x 6 x 12 in. for continuous operation at 2600° F; box furnace 5½ x 7½ x 14¼ in. with reactor control; a 3-kw high-frequency induction furnace; a horizontal-tube furnace; a vertical-tube furnace 5 in. OD x 8 in. effective and a high-temperature pot furnace for operation at 2500° F. Additional units will be added upon demand.

For More Details Circle No. 433—Page 225

Vernier Caliper

contains design features which provide improved accuracy

L. S. Starrett Co., Athol, Mass.—Precision vernier caliper, No. 123 satin chrome master-vernier caliper, is said to have features which con-

You'll find abrasives by Cleveland!

Foundries, metal-working plants; wherever you find peening or blast cleaning, you'll find shot and grit manufactured by the Cleveland Metal Abrasive Company.

Only Cleveland Metal Abrasive Company produces REALSTEEL* cast steel shot and grit. Your assurance of consistently high quality and uniformity at the lowest possible cost.

Impact cleaning . . . preparing surfaces for finishing . . . removing scale . . . or for any other cleaning or peening problem, Cleveland Metal Abrasive Company has the right shot or grit for you.

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One of the world's largest producers of quality shot and grit—Hard Iron—Malleable (Normalized*)—Cut Wire—Cast Steel (Realsteel*)
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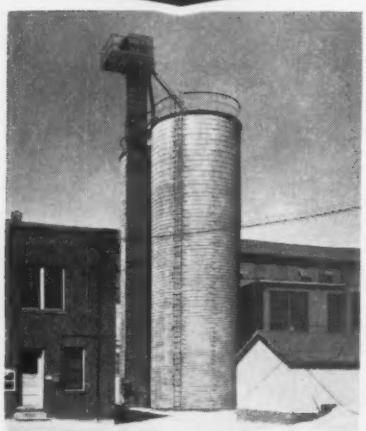
MARIETTA CONCRETE SILOS



Eliminate molding sand waste and costly handling methods with a MARIETTA storage system engineered to your foundry operation.

Marietta silos are economically erected in any desired capacity . . . any number of units. Interlocking concrete stave construction provides safe, dry storage . . . resists wind, shock or fire . . . requires a minimum of maintenance.

Conveyors, feeders, discharge systems or other auxiliary equipment for your particular material handling requirements can be mounted on the sturdy walls of a Marietta silo.

Depend on Marietta's 41 years of experience to design and erect the most efficient storage system for your need under one cost-saving contract. No delays due to critical material shortages with a Marietta installation . . . erection is quickly and efficiently handled by factory trained personnel.

Write for Marietta's Modern Industrial Storage Systems Booklet and the right answer to your bulk storage problems.

THE *Marietta* CONCRETE CORPORATION
41 Years Know-How in Pre-Cast Concrete Construction
Marietta, Ohio

BRANCH OFFICES: Baltimore 21, Md., Charlotte 6, N.C., Nashville, Tenn., Jamestown, N.Y.

Circle 718 on Inquiry Card—Page 225

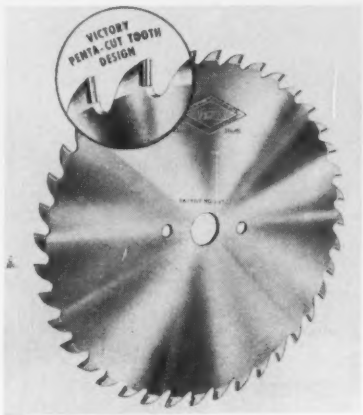
tribute to improved accuracy, easier, faster setting and reading, greater rigidity and longer life. Both vernier plates fit flush with the main scale to eliminate reading errors due to parallax. Open-face design permits placing both the inside and outside scales on the same side of the tool. Caliper is held and read the same for inside and outside measurements. The caliper is made in 12 and 24-in. sizes graduated in thousandths to read the full 12 or 24-in. lengths.

For More Details Circle No. 434—Page 225

Carbide-Tipped Saw

is for circular blade cutting of nonferrous metals

Victory Carbide Saw & Tool Co., 3856 North Ashland Ave., Chicago 13, Ill.—Carbide tipped saw features "Penta-Cut" carbide tooth design for cool, smooth cutting of nonferrous



metals. Tips are of alternate male and female design to provide five cutting edges in every set of two teeth. The male tooth in the set has a slightly wider kerf to provide a planing or shaving action on the side of the material as the saw cuts. The saw can be machine sharpened since all cutting edges are on the same periphery. Blades are available in 12, 16, 18 and 20 in. diam.

For More Details Circle No. 435—Page 225

Air-Motor Grinders

are for grinding, buffing and polishing operations

Airetool Mfg. Co., Springfield, O.—Portable air-motor grinders and attachments are used for grinding, buffing and polishing castings, forgings and welds. A horizontal model (available with a special abrasive belt attachment) and a right-angle model (shown) are made. The horizontal model weighs 12 lb, less the 6 or 8-in. abrasive wheel, is 21 in. long and can be operated at speeds of either 4500 or 6000 rpm. The right-angle model weighs 13½ lb, less the cup-type wheel, and is 17½ in. long and

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Dangerous and expensive shutdowns were avoided when a Dandux Double Insulex stitched canvas belt was installed in the refractory above. The heavy asbestos cover, with two insulation layers between it and the body of the belt carried material at 700°, more than twice as long as the rubber belt previously used.

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Chicago	St. Louis
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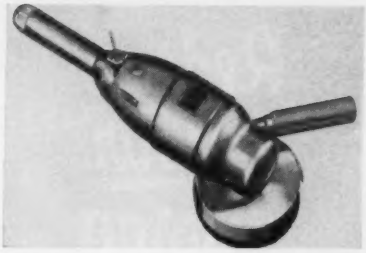
Circle 719 on Inquiry Card—Page 225



operates at 6000 rpm. The abrasive belt attachment weighs 4 lb and the 4-in.-diam contact wheel has a firm, resilient backing which permits maximum grinding ease and prevents undue wear on the 2 x 20-in. abrasive belt.

For More Details Circle No. 436—Page 225

Erosion Arrestors

protect coreboxes from wear under the blow tube area

Dike-O-Seal Inc., 1209 West 59th St., Chicago 56, Ill.—Thin, resilient, self-adhering and abrasion-resistant protective material buffers the abrasive action of high-velocity sand striking areas beneath the blow tubes in coreboxes. A simple two-step operation reportedly permits in-process application, thereby reducing downtime losses. A maintenance preventive when applied to new boxes, it is effective in older boxes when applied over eroded areas that have been repaired. The pads are available in round shapes from ½ to 4 in. in diameter in ¼-in. increments and in rectangle and square shapes 4 x 6 and 12 x 12 in.

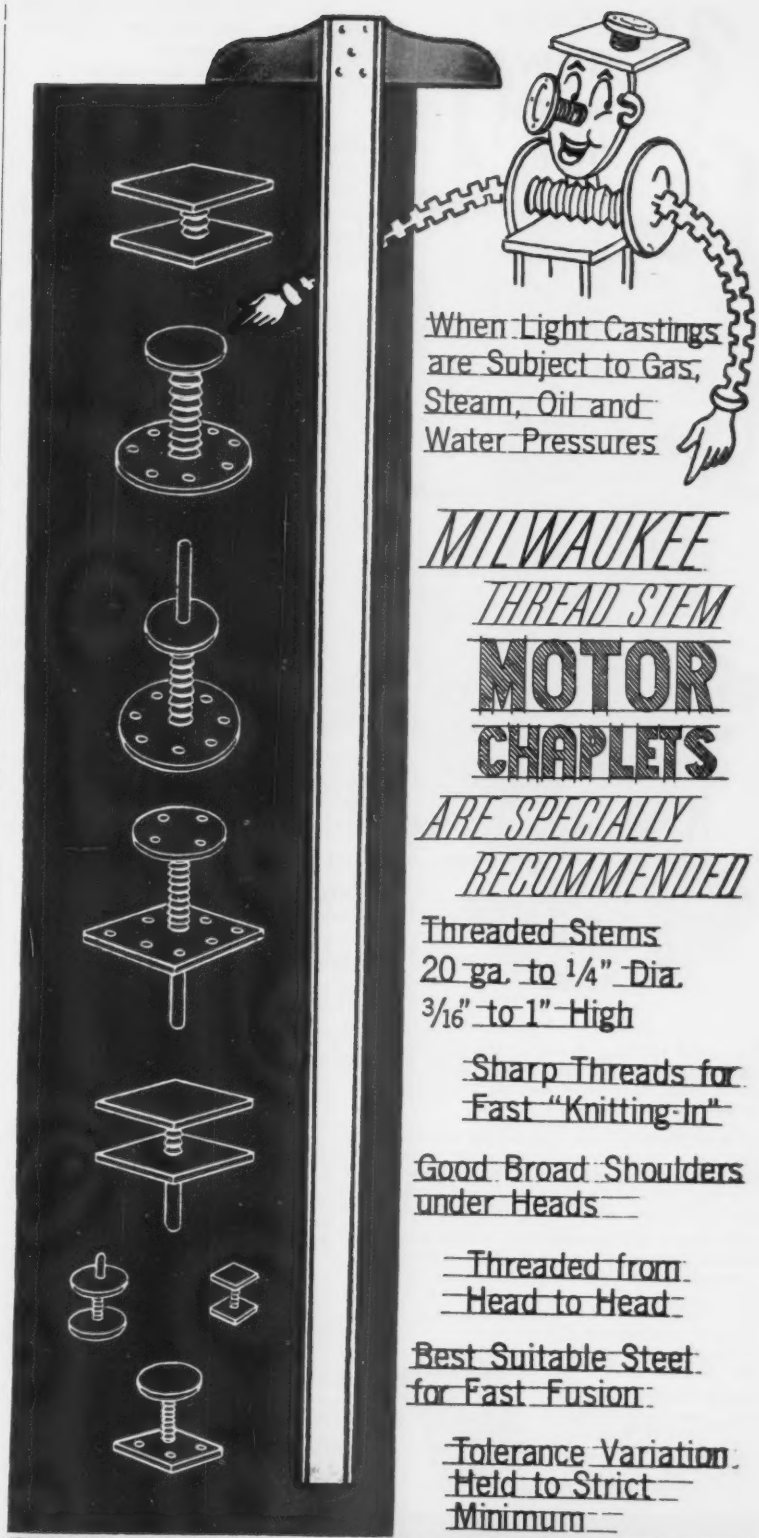
For More Details Circle No. 437—Page 225

Bench Vise

eliminates hand clamping and speeds bench operations

Wilton Tool Mfg. Co., Schiller Park, Ill.—Air hydraulic vise eliminates wasted time and labor of manual clamping and speeds production on

bench operations. The vise will open and close up to 2000 times an hour at the touch of a foot pedal air control. Maximum jaw locking force varies between 2513 to 6891 lb, depending on size. Since locking force varies directly as the air input pressure, it can be reduced to prevent damage to soft work pieces;


When Light Castings are Subject to Gas, Steam, Oil and Water Pressures
MILWAUKEE
THREAD STEM
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CHAPLETS
ARE SPECIALLY RECOMMENDED
Threaded Stems 20 ga. to 1/4" Dia. 3/16" to 1" High
Sharp Threads for Fast "Knitting-In"
Good Broad Shoulders under Heads
Threaded from Head to Head
Best Suitable Steel for Fast Fusion
Tolerance Variation Held to Strict Minimum
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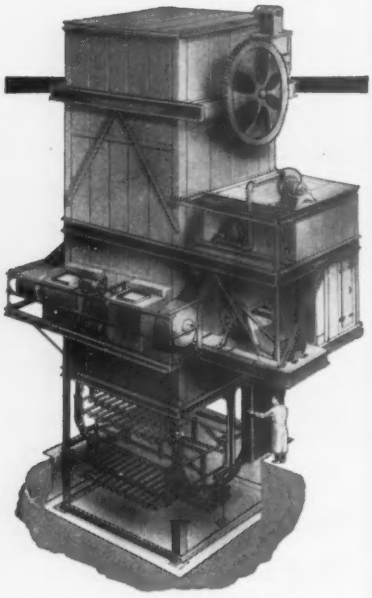
HOW MUCH DOES A FOUNDRY OVEN COST?



We could tell you down to the penny what the conveyor core oven pictured above cost. But that wouldn't really be the answer you would want.

Because the real cost of any oven comes *after* it's been installed. *After* you find out how much fuel it consumes; how many rejects pile up; how much production you get. That's the answer!

And that's the answer you *will* get—before the oven is installed—when experienced MOCO engineers specifically design an oven for your application. It will be the most economical piece of equipment possible. Why not contact MOCO today?

SEND TODAY for this free brochure explaining MOCO Foundry Ovens and their operation.

FOUNDRY OVEN DIVISION
MICHIGAN OVEN COMPANY
419 BRAINARD
DETROIT 1, MICH.

Circle 721 on Inquiry Card—Page 225

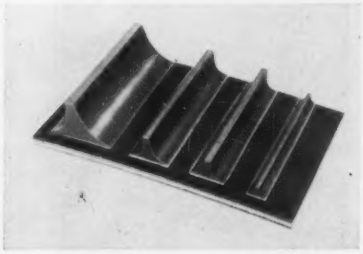
the main screw and nut are engaged at all times and jaws can be preset to any desired opening.

For More Details Circle No. 438—Page 225

Conveyor Belt Cleats

for inclined belts are attached easily and quickly

Flexible Steel Lacing Co., 4607 Lexington St., Chicago 44, Ill.—REMA cleats can be used to advantage on



conveyor belts that are inclined to the point where material being transported has a tendency to slip or roll back down the belt. They can be applied to the belt at 90 degrees (across the belt) in the form of chevrons or "V's", along the sides of the belt to act as guide rails, or in any other desired pattern. Cleats are supplied in 7/16, ¾, 1 and 1½-in. heights, all in 36-in. lengths.

For More Details Circle No. 439—Page 225

Outdoor Fork Lift Truck

has power brakes and fingertip directional controls

Industrial Truck Division, Clark Equipment Co., Battle Creek, Mich. —Power brakes, power steering and fingertip directional control are standard on 8000-lb capacity, pneumatic-tired fork lift truck called the

Yardlift 8024. With four speeds in each direction, the truck will travel 16½ mph forward and 16 mph in reverse and climb a 21 per cent grade loaded. A spool type valve

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CERAMIC STRAINER CORES

It's a fact, that Porcelain Products *ceramic* strainer cores will reduce casting rejects — provide higher quality, slag-free castings for your customers—and save *you* money besides. Porcelain Products ceramic cores will not spall, erode or disintegrate during pouring, resulting in a foundry product free of sand inclusions. Porcelain Products cores permit controlled pouring—reduce machining time. They will withstand high heat, thermal shock—can be stored indefinitely.

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63 years
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FINDLAY, OHIO

Circle 722 on Inquiry Card—Page 225

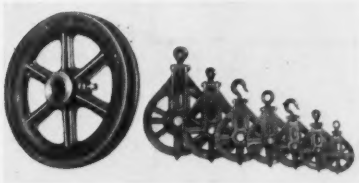
controls the hydraulic system and provides lift speeds of 48 fpm empty and 42 fpm loaded. An axle-mounted telescopic upright tilts 4 degrees forward and 12 degrees backward. Length is 132 in. Width is 77 in. Wheelbase is 86 in.

For More Details Circle No. 440—Page 225

Blocks and Sheaves

are being made available to industry as separate items

Sauerman Bros. Inc., Dept. FYC, 620 South 28th Ave., Bellwood, Ill.—Durolite blocks and sheaves used on company's DragScraper machines and cableways are available to industry. Sheaves are available in stock sizes



from 6 to 18 in. (alloy steel) and 20 to 24 in. (cast steel). Blocks are available from stock in sizes from 6 to 18 in. with bronze bearings and from 8 to 42 in. in roller bearings. Sizes up to 54 in. or specials can be made to specification.

For More Details Circle No. 441—Page 225

Colorimetric Analysis

of aluminum alloys is covered in new procedures manual

Bausch & Lomb Optical Co., 635 St. Paul St., Rochester, N. Y.—A set of industrial methods is available for the colorimetric analysis of aluminum alloys. Procedures in the aluminum series are: 1) Manganese by the persulfate method 2) copper by the diethyldithiocarbamate method 3) nickel by the diemethylglyozime method 4) chromium by the chromate method and 5) iron by the o-phenanthroline method.

For More Details Circle No. 442—Page 225

Cast Iron Electrode

has a flux coating of 55 to 60 per cent nickel alloy

All-State Welding Alloys Co., 249-55 Ferris Ave., White Plains, N. Y.—Machinable cast iron electrode features a flux coating on a 55 to 60 per cent nickel alloy and manufacturer recommends it for welding high-phosphorus irons, for work requiring high strength in the weld area and for welding heavy sections. The electrode is applicable with alternating or direct current, reverse polarity, at amperages ranging from 40 to 180. Sizes available are 3/32, ⅛, 5/32 and 3/16-in. Standard packages are 5 lb, ten to a carton.

For More Details Circle No. 443—Page 225

for faster, cheaper, more effective cope and drag sealing

. . . and here's why

- Faster, easier and better than mud or dough rolls!
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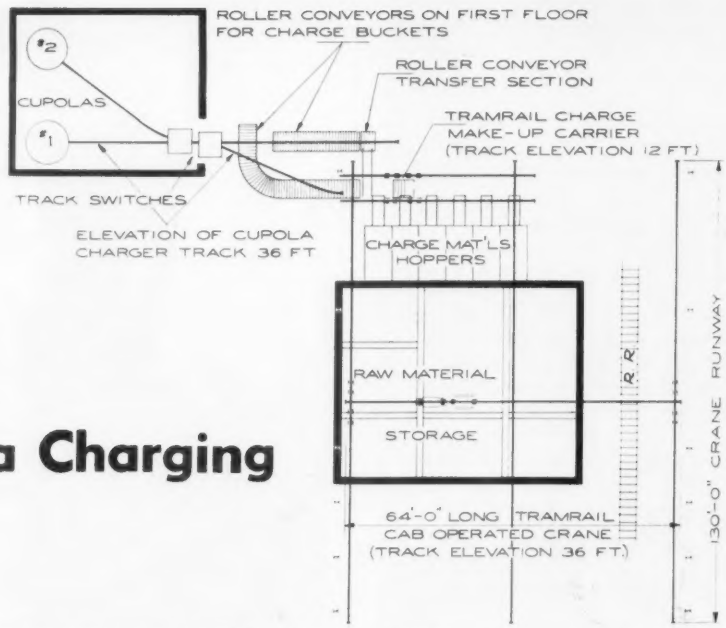
Diagram shows layout of overhead system for handling cupola charging



Overhead System Effective in

Handling Cupola Charging

ALL material handling required to charge cupolas in the heavy foundry division of Standard Foundry Co., Worcester, Mass., is done with overhead equipment. These operations include unloading incoming materials, distributing them into storage, making up charges and delivering charges to the cupolas.

Standard Foundry is rated as a medium-sized plant and is one of the larger jobbing foundries in New England. The tramrail system has served the heavy foundry division for 11 years. From 40 to 45 tons of gray iron castings are produced daily, largely for machine tools manufactured by many of the makers of such equipment in the vicinity. Sizes range from small castings to some which weigh as much as 10 tons.

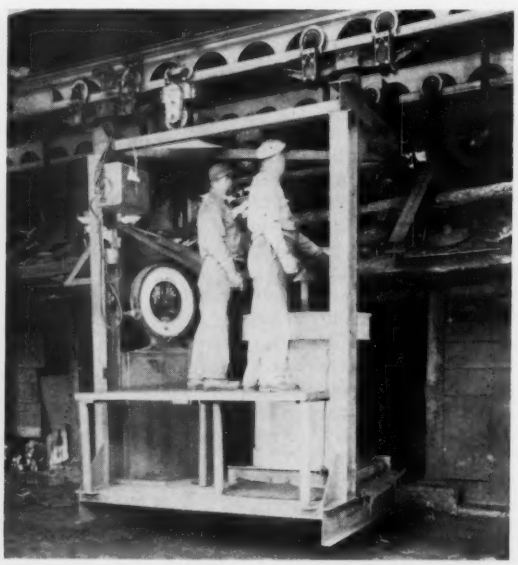
Raw materials come in by railroad cars and trucks and are handled by a 3-ton, three-runway, cab-operated crane which is 64 ft long and equipped with a 36-in. magnet. This crane places from 40 to 45 tons of such materials per day in the large storage bins shown in the foreground of Fig. 1. The same crane fills a series of hoppers (rear, Fig. 1) in the charge-gathering area with materials from the storage bins. The crane is busy 12 hours a day and operates at 300 fpm. Hoist speed is 50 fpm. The runway is 130 ft long.

Stacks of the two 54-in. cupolas are visible in the upper left in Fig. 1. The charging unit is a few feet to the right of the door to the cupola room, at the point where it hoists the charge buckets from below. This unit is rated at 4500-lb capacity and travels at 300 fpm. It has a lift of 30 ft and hoisting speed of 48 fpm. The cab is heated electrically.

Charges are made up with a tramrail charge-gathering car that travels on a two-track runway alongside the hoppers, as shown in Fig. 2. Two men normally work on the car, placing the various materials directly into a charge bucket. The bucket sits on a short roller conveyor sec-

Fig. 1—A 3-ton crane places 40 to 45 tons of material per day in storage bins and fills hoppers visible in the rear

Fig. 2—Charges are made up with tramrail charge-gathering car on two-track runway which operates alongside hoppers



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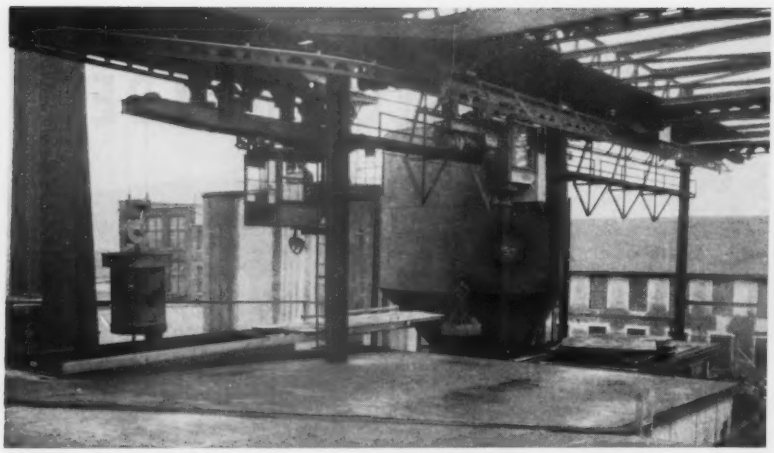


Fig. 3—View shows both the 3-ton crane which operates over the raw material storage area and the unit which transports charges to the cupola

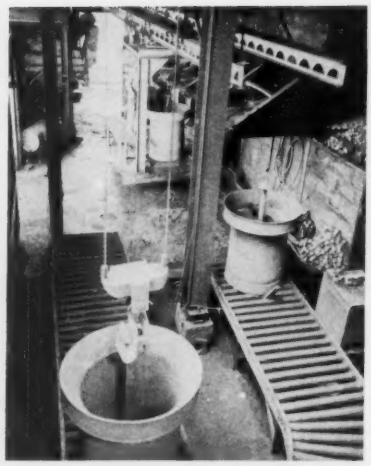


Fig. 4—Over-all view illustrates charge accumulation area layout

tion which is a part of the car. All materials are weighed carefully by a scale mounted on the car. The scale is an automatic-recording, printweigh type and provides a record of all materials which go into each charge. Charge materials in a full bucket weigh aproximately 2000 lb.

Fig. 3 shows both the 3-ton crane, which operates over the raw material storage area, and the furnace-charging unit. The crane is shown interlocked with a track on which the charging unit can travel. This arrangement permits the cab-operated carrier on the crane to be moved off the crane to a location where it can be reached and serviced easily. The charging unit may be seen above the opening in the roof where buckets are hoisted from or lowered to the roller conveyor on the first floor.

When a charge has been made up, the tramrail charge-gathering car is moved to the end of its runway, where it engages a roller conveyor as shown in Fig. 4, an over-all view of the charge accumulation area. Operator picks up buckets with a special hook that engages with the bucket stem. The bucket is pushed off the car conveyor onto the latter conveyor.

It travels by gravity to the pickup area, where the tramrail cupola charging unit hoists it through an opening in the ceiling and delivers it directly to a cupola. Fig. 5 illustrates the cupola charger as it takes a loaded bucket into the building where the two cupolas are located. Fig. 6 shows the bucket as it is moved into the cupola for discharge.

The charging unit returns the empty bucket to the conveyor where the latter rides by gravity to the far

Fig. 5—Tramrail cupola charging unit is shown here as it takes loaded bucket into the building where the company's two cupolas are situated

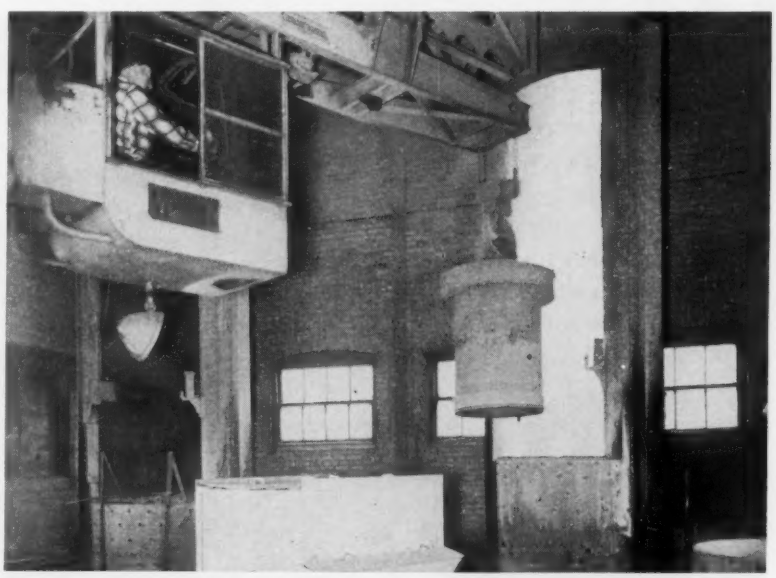
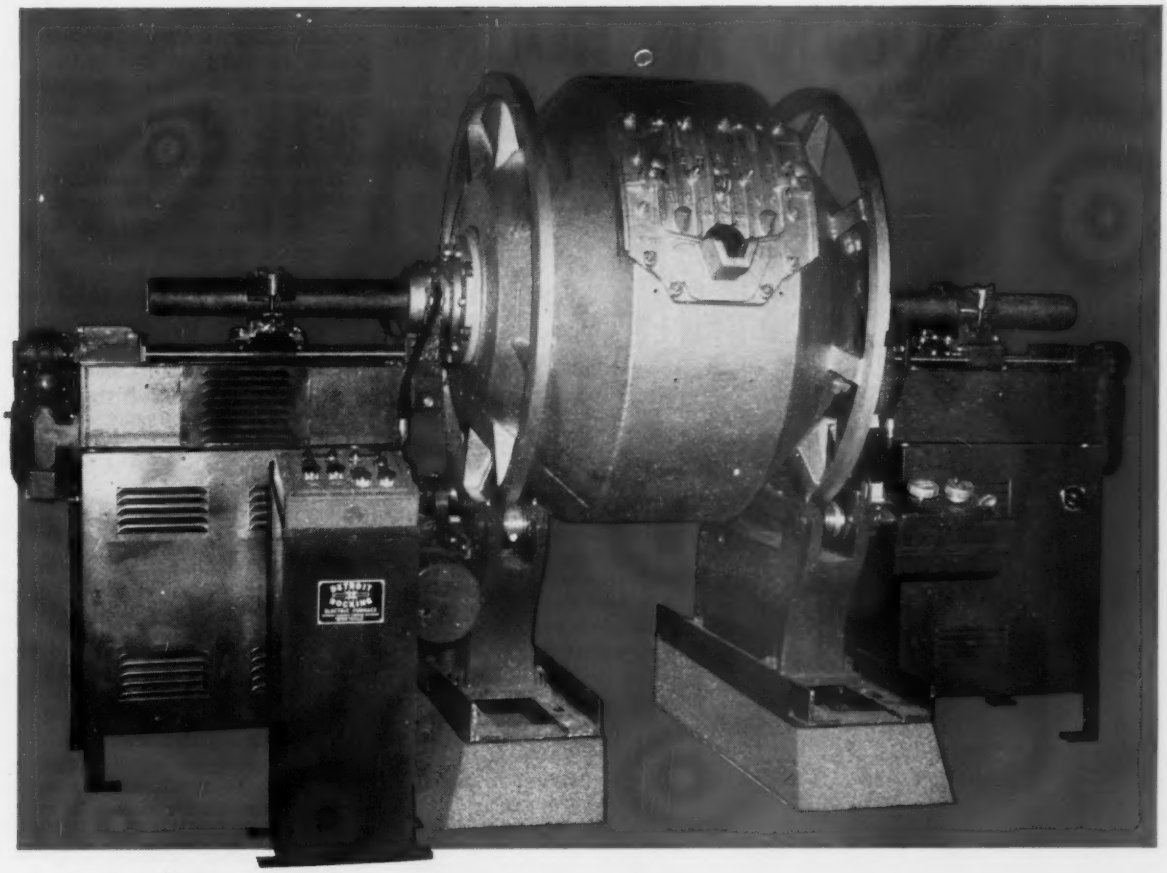


Fig. 6—In this illustration, bucket is being moved into the cupola for discharge. Charge weighs about 2000 lb and bucket is drop-bottom type



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For full details on the new "P" Series indirect arc Detroit Furnaces, write for Bulletin 5610.

Ratings for furnaces with pedestal-mounted electrodes, motor controlled

Furnace Type	KW Rating	Nominal Cold Charge	Minimum Molten Metal
LFCP	125	350	500
LFNP	150	500	750
LFYP	175	700	1250
AAP	250	1500	3000
AAP	400	1500	3000
CMP	400	4000	8000
CMP	600	4000	8000

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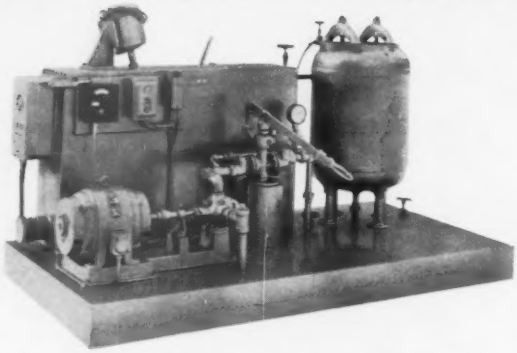

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Circle 726 on Inquiry Card—Page 225

SIZED TO FIT YOUR CUPOLA

You can choose from 5 sizes when you specify Semet-Solvay Foundry Coke. Each is the best you can buy—uniform in analysis, sturdy and blocky in structure. Call your Semet-Solvay man today.

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For Better Melting

end of the conveyor, onto a movable section. This conveyor section is pushed manually in line with the roller section on the charge-gathering car. The empty bucket then is rolled easily onto the car, ready to begin another cycle.

This cupola charging system, manufactured by Cleveland Tramrail Division of Cleveland Crane & Engineering Co., Wickliffe, Ohio, requires only three charging buckets, yet provides enough raw materials to melt 9 tons of metal per hour. Because the charging area is completely roofed over, the men no longer have to work outdoors in bad weather. In addition, it takes the drudgery from the work by elevating the personnel involved from the position of laborers to that of operators.

Guide Covers Screw Conveyors

A guide to planning the construction of screw conveyors has been prepared by the Canadian National Research Council and made available to American industry through the Office of Technical Services, U. S. Department of Commerce.

Screw conveyors are described as inexpensive to install, easy to maintain and suitable for such bulk materials as foundry sand, ore, coal, limestone and other products. The report discusses design and construction of the conveyor, with particular attention to the screw. It also lists related publications.

Entitled *Screw Conveyors,* the report is designated PB 121324. It may be ordered from OTS, U. S. Department of Commerce, Washington 25, D. C., for 50 cents per copy.

Book Review

Defects and Failures of Metals—Their Origination and Elimination by E. P. Polushkin, cloth, 399 pages, 6 x 9 in., distributed by D. Van Nostrand Co., 257 Fourth Ave., New York 10, N. Y. Price $12.50.

This book examines the failures and defects of whole field metals and their alloys; their origin, causes and elimination are described and where applicable the close correlation between types of failures is shown. Extensive references to the available literature are included with each chapter. The author divides the collected data for each defect under six separate sections: Definition and general characteristics; origin, causes and contributing factors; means of discovery or identification, methods of testing; occurrence, most common location or susceptibility; detrimental effects; prevention, correction and elimination.

Circle 727 on Inquiry Card—Page 225

Announcing

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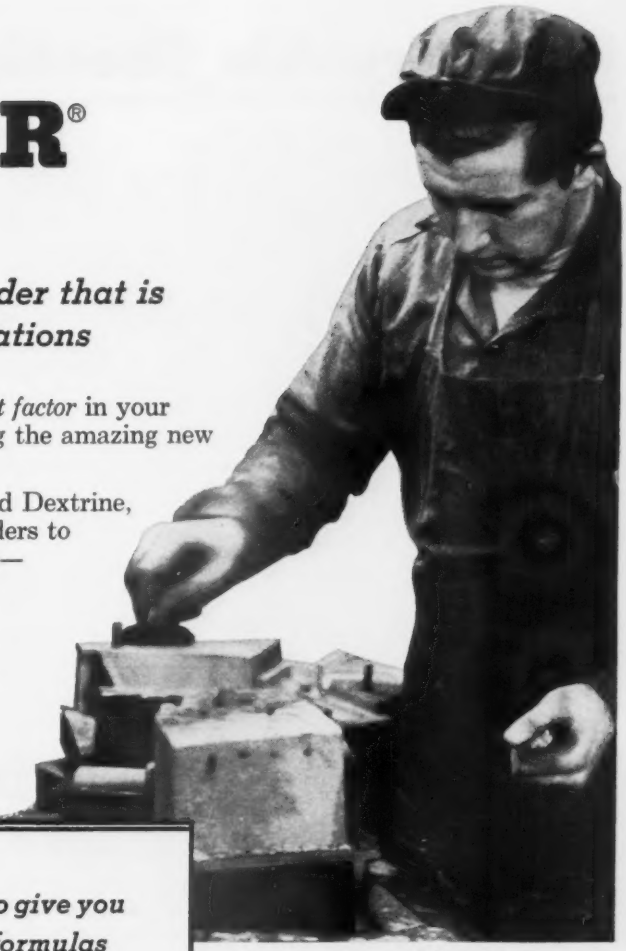
BINDER

. . . a sensational new type of binder that is revolutionizing core sand formulations

NOW—you can get top score on *every important factor* in your core and facing sand formulas. How? By using the amazing new binder—DEXOCOR!

An exciting teammate of Mogul, Kordek and Dextrine, DEXOCOR works with these time-tested binders to bring you real improvements all along the line—to step up core quality and production to an all-time high, without increasing costs!

Dry, easy to handle, DEXOCOR boosts green strength, shortens baking time, imparts high moisture resistance, high hot strength, easy shake-out and other important characteristics, as shown in the table below.



Do your core sand formulas mix, ram, dry in record time, produce clean, smooth castings? For real improvement all along the line *Ask the man from Corn Products.* He'll gladly demonstrate DEXOCOR!

Here's how* DEXOCOR *works to give you top-scoring core and facing sand formulas

FACTOR	RECOMMENDED COMBINATION OF BINDERS
Green bond	Mogul plus DEXOCOR
Dry bond	DEXOCOR plus Kordek
Green sand	Mogul plus Dextrine or DEXOCOR
Dry sand	Kordek plus DEXOCOR
Flowability	Dextrine or Kordek
Moisture resistance	DEXOCOR
Collapsibility	DEXOCOR plus Dextrine • Kordek or Mogul
Scratch hardness	DEXOCOR plus Dextrine or Kordek
Reduced baking time	DEXOCOR
Reduced gas	DEXOCOR
Better blowing	DEXOCOR plus Mogul
Easy ramming	DEXOCOR plus Mogul
Simplified, cleaner mixing	DEXOCOR
Easy shake-out	DEXOCOR • Mogul • Kordek or Dextrine
Reduced veining	DEXOCOR
Smoother casting finish	DEXOCOR
Dry, easily handled	DEXOCOR • Mogul • Kordek or Dextrine
Less waste in handling	DEXOCOR • Mogul • Kordek or Dextrine
Better core paste	Kordek
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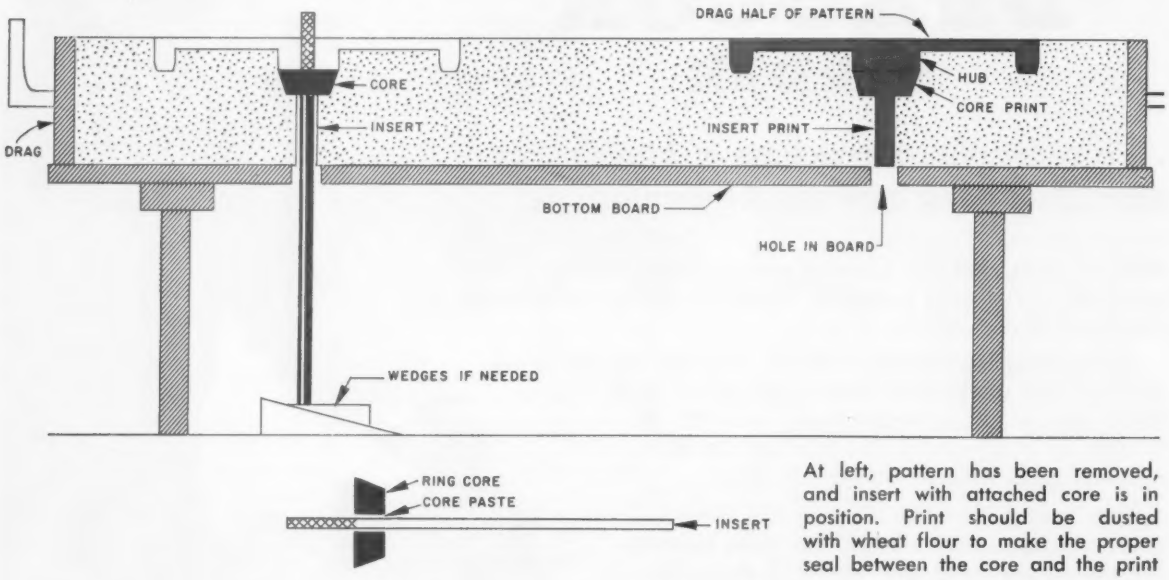
Makers of MOGUL® • KORDEK® • GLOBE® dextrine

Circle 728 on Inquiry Card—Page 225

Trouble Shooting

By C. W. AMMEN



At left, pattern has been removed, and insert with attached core is in position. Print should be dusted with wheat flour to make the proper seal between the core and the print

How To Avoid Deep Drags

Dear Charlie:

EVERY time I draw a long-run job in aluminum, I seem to catch the kind that by nature takes a lot of sand for a light, thin casting. The job I have reference to is a part which is only about 1½ in. in the cope and 2 in. in the drag, two to a 12 x 18-in. flask. Now, here's the rub: An insert ½ in. in diam and 9 in. long is cast in a boss at right angles to the job in the drag side of the casting.

This setup requires that I have about a 15-in.-deep drag for nothing, so to speak. The pattern has a long print on the drag which makes a socket in which to place the insert. The necessary amount sticks up into the mold cavity at the boss, where it hooks on. The job cannot be parted so as to put the insert parallel to the parting. It wouldn't be so bad if only a few parts were required, but I have a goodly amount to produce. The customer, like many others, will not budge an inch as to redesign. What say? I have an across-the-board, per-pound price for all this firm's work.

Sincerely,
Sam

Dear Sam:

Such is life in the foundry. The good jobs are short run, the tough jobs, long run. The only thing the average foundryman can do when it comes to a job where the customer won't come across with a change is to outfox him and rig around the job or charge him enough. The amount of rigging done by the foundry should, however, be governed by the job concerned. I have seen foundries go to some length and expense to offset strange design, faulty or ill-planned pattern equipment, etc., saying, "We will pick up this loss and clean house on the next run." Oh, boy!

This practice is for the most part for the birds. I have gone to no end of trouble and expense in rigging a job, not passing the cost on to the customer, figuring to pick it up next time around, only to find myself holding the sack with no profit. It's like giving the customer a flat, across-the-board, per-pound price on all his work, catch as catch can. The woods are full of shops which do this. The only thing the foundry really has to sell, however, is labor and service—the metal cost is passed on to the customer.

You cannot sell labor and service by the pound, like oranges and apples. Since each job is for the most part different, each must be priced individually. The only way a job can be priced by the pound is to calculate all the cost involved, including profit, and divide this figure by the casting weight. You then will have a per-pound cost to give the customer. This method applies, however, only to a given job.

If you wanted a shaft made by a machine shop and wanted a price per-pound, they would think you were nuts. The machine shop would estimate how many hours it would require to make the shaft, multiply this by a burden factor, add on profit and cost of raw material and give you a price. This price, divided by the weight of the shaft, would give you a per-pound price for that shaft.

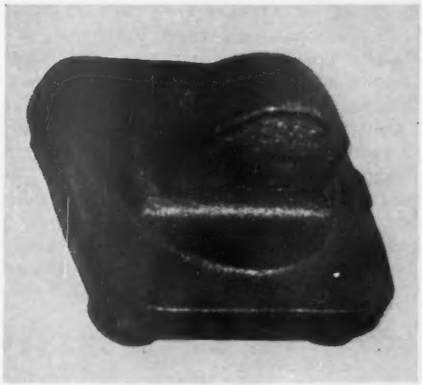
The easiest way of going broke that I know is to flat-rate work by the pound. If your taxes, labor, utilities, supervision, etc., plus a profit, cost you say $10 per hour for an

*B.G.

and

**A.G.

...two dates malleable founders will remember!



*B.G.—Before Grundite Bond was used. Note pin hole porosity . . . typical on chunky castings and often not revealed until annealing. Pin hole porosity has been proven to be related to the bond used and specifically the release of its chemically combined moisture.

**A.G.—After Grundite replaced the previous bond—the only change made in the sand—all pin holes stopped. Grundite Bond increases mold density with resulting smoother casting finish; faster, easier shakeouts. Scrap losses reduced.

Pin hole porosity and clay bond have known relationship in the production of malleable castings. Pin holes usually appear in heavy metal sections as illustrated (Upper Photo.).

The release of chemically combined moisture from the clay bond at pouring temperatures will vary with the bond. Grundite Bond (Illite Clay) gives up its chemically combined water gradually whereas other bonds release this moisture abruptly. This abrupt release is considered to be the factor which induces pin holes.

Many malleable founders have proven the relationship between clay bond and pin hole porosity by merely substituting Grundite for their regular bond . . . and obtained results such as shown (Lower Photo.). We are sure you, too, will find Grundite stops pin hole porosity, improves casting finish, speeds up cleaning room time with savings in costs. Write today for a working sample and quotation.

GRUNDITE BOND

A PRODUCT OF

ILLINOIS CLAY PRODUCTS COMPANY

208 S. LaSalle Street Chicago 4, Illinois

hourly burden, and you spend three hours on a job, you must charge $30 plus metal and shrinkage to make money on the job as a unit. Make no mistake—you must know your costs and charge for them.

I lost a customer for whom we made small, light, loose-pattern castings in brass. A top bench molder could produce only about 42 lb per day, and the per-pound price averaged $2.25, figured as I have described. A bedroom, one-pot foundry took the work for 60c per pound, including any and everything. The customer figured we must have been robbing him. The bedroom foundry went bankrupt last month, and the job is back to us at $2.25 per pound.

It only stands to reason that you must sell for more than the job costs you. Bankrupt foundries are quite common these days. I buy sand, coke and metal by the pound or ton, but for the life of me I cannot seem to be able to reduce my operating costs (labor, taxes, utilities, etc.) into pounds of anything. I can, however, tell you at the end of every month how much it cost me to make and ship so many pounds of castings. Oh well, I could carry on by the hour about costs.

As to your problem—if your insert is not too heavy, it can be hung down through the drag and bottom board, the flasks being set up on two 2 x 12-in. wooden rails.

A shop out here produces aluminum horses—some sort of amusement park equipment. Each horse requires a small aluminum steering wheel which is cast onto a cold-rolled shaft 7 in. or so long, in very much the same manner as your insert. To prevent using an excessive amount of drag flask, the drag side of the hub was fitted with a print for a circular core and a print the size of the insert in diameter, just long enough to come flush with the bottom of the drag.

Each bottom board is drilled with a hole slightly larger than the diameter of the insert, and each insert is fitted into a core which matches the print on the hub, leaving the desired amount of insert sticking into the hub cavity. The drags are placed on 2 x 12-in. runners set on edge. A little wheat flour is dusted into the print, and the inserts are placed in the molds, hanging down through the bottom boards. There you have it. The cost of making up the little ring cores and drilling the boards is by far offset by the increased production. Should the insert be fairly heavy, a small wedge could be placed between the bottom of the insert and the floor.

Sincerely,
Charlie

Want core plates that SAVE MONEY?

. . . then use TRANSITE CORE PLATES for easy handling, low maintenance, long life!

You get real long term economy with Transite* Core Plates. Their initial cost is low . . . and their maintenance cost negligible. Transite Core Plates are tough and corrosion-resistant. They are made from an asbestos and cement composition by a special Johns-Manville process. They resist shock and corrosion . . . will not crack or break easily.

Here are other important reasons for using Transite Core Plates:

THEY SPEED PRODUCTION—
Transite Core Plates are easily handled. They're simple to clean, too, since core wash, sand, etc. do not adhere to them as readily as to other core plate materials.

THEY MAINTAIN ACCURACY—
Foundrymen who have used Transite Core Plates for years report minimum warpage.

For cores of large mass and small surface area, perforated Transite Core Plates are also available to eliminate green cores and reduce baking time. For full details, write Johns-Manville, Box 14, New York 16, New York.

*Reg. U. S. Pat. Off.

Johns-Manville TRANSITE CORE PLATES
Made of Asbestos

Surveys Equipment Replacement And Depreciation Policies

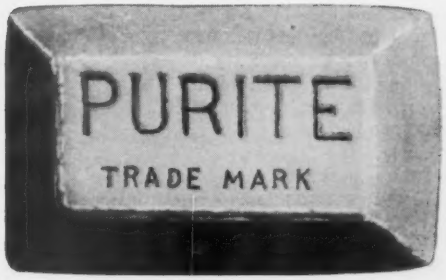
A survey on equipment replacement and depreciation policies and practices in the capital goods industries has been published by the Machinery & Allied Products Institute, Washington, D. C. It is a follow-up to a similar MAPI survey made in 1948 and reflects the replies of 296 manufacturers of capital equipment.

In addition to the results, the booklet, called *Equipment Replacement and Depreciation,* contains introductory remarks, comments and observations and two bibliographies. Of the latter, the first is a selected bibliography on equipment analysis and the second a bibliography of MAPI publications on depreciation.

Single copies are available for $1 from MAPI, 1200 Eighteenth St. NW, Washington 6, D. C. Quantity prices are available on request.

TAME

high sulphur scrap with



Shooting for sound, strong, machinable castings from high-sulphur scrap . . . or for faster, cleaner melting? Your best bet on *both* counts is Purite.

Here's what Purite accomplishes in the cupola. Reduces sulphur content as much as 25%. Increases slag fluidity. Speeds combustion reaction and checks bridging.

And in the ladle . . . Purite desulphurizes the metal to exact specifications; assures clean, quiet-pouring metal for quality castings.

You can't beat Purite's convenience, either. The solid, non-crumbling, 2-pound pigs are a natural for simple storing and easy usage.

Ask your foundry supply house why Purite has been a favorite among progressive foundrymen for over 30 years. And for the full story on how Purite goes to work to increase your profits, write—

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4551

An Efficient Method of Reclaiming . . .

Oily Aluminum Turnings

By ROBERT E. MORKEN
Highland Park Division, Chrysler Corp.
Detroit

SHORTLY after World War II, in a disturbed aluminum market, Chrysler Corp. decided to install equipment to reclaim aluminum scrap created in its manufacturing operations. This move was necessary at the time in order to maintain control of the extensive amounts of aluminum required for pistons.

Chrysler uses aluminum pistons in all its engines. About 75 per cent of these pistons are cast in permanent molds in Chrysler's aluminum foundry, and the remaining 25 per cent are purchased from outside sources. All pistons are machined in Chrysler plants.

These machining operations provide some 20,000 lb per day of oily turnings. In addition, other scrap is available from the foundry operations, die casting operations and miscellaneous sources. The total scrap available is enough to provide about 60 per cent of the metal necessary for the piston foundry.

An analysis of methods to be employed in the proposed reclamation facilities revealed several serious problems. Since such a large volume of metal was to be recirculated continuously within our plants, it was necessary to control very closely the extent of iron pickup in the metal.

Numerous laboratory tests of our scrap materials indicated that approximately 0.30 per cent uncombined iron was present. Further tests showed that most of this iron was very fine particles adhering to the oily aluminum chips—evidently from abraded cutting tools. Of course this iron had to be removed if the reclaimed scrap was to be used for pistons.

Magnetic Separation—Magnetic separation appeared to be the best way to remove the iron. To separate iron from oily chips magnetically, however, the chips first must be dried. A survey of commercial drying installations was made, and close studies conducted.

It was observed that most of the installations examined presented one or more difficulties. We felt that the most economical and generally satisfactory method of drying oily chips is in a direct-gas-fired cylindrical rotating drum. Ordinarily, in these commercial installations, the oily turnings are fed into the drum at the end opposite the source of heat.

Chips are carried through the drum countercurrent to the heat by a helix welded to the inside of the revolving drum. An attempt is made to control heat input to the extent that the oil is vaporized from the chips, rather than burned.

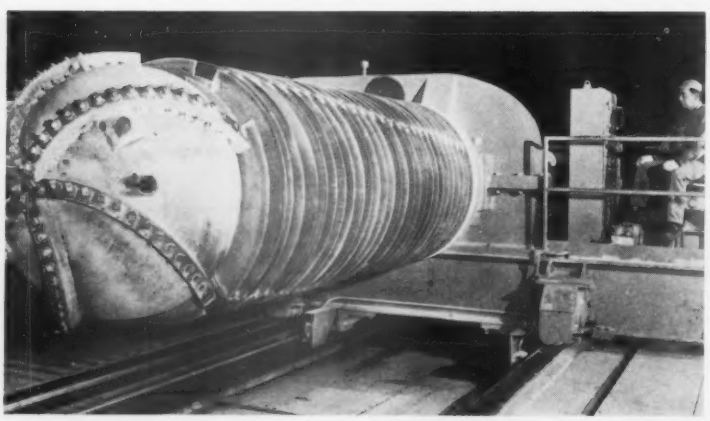
This method controls oxidation of the chips, but causes much smoke. In addition, a severe explosion hazard is inherent in this method. Oily chips include a highly variable amount of oil. The amount is determined by the surface area of the chips, and, since the chips vary in thickness, oil content per unit of weight is extremely variable.

This method therefore is difficult to control and usually requires a considerable amount of manual adjustment of the equipment. Such considerations are not tolerable in the automotive industry. Moreover, we didn't feel we could locate an explosion hazard in the center of a plant employing several thousand people. The smoke condition this method creates also is intolerable in our location in a congested residential neighborhood.

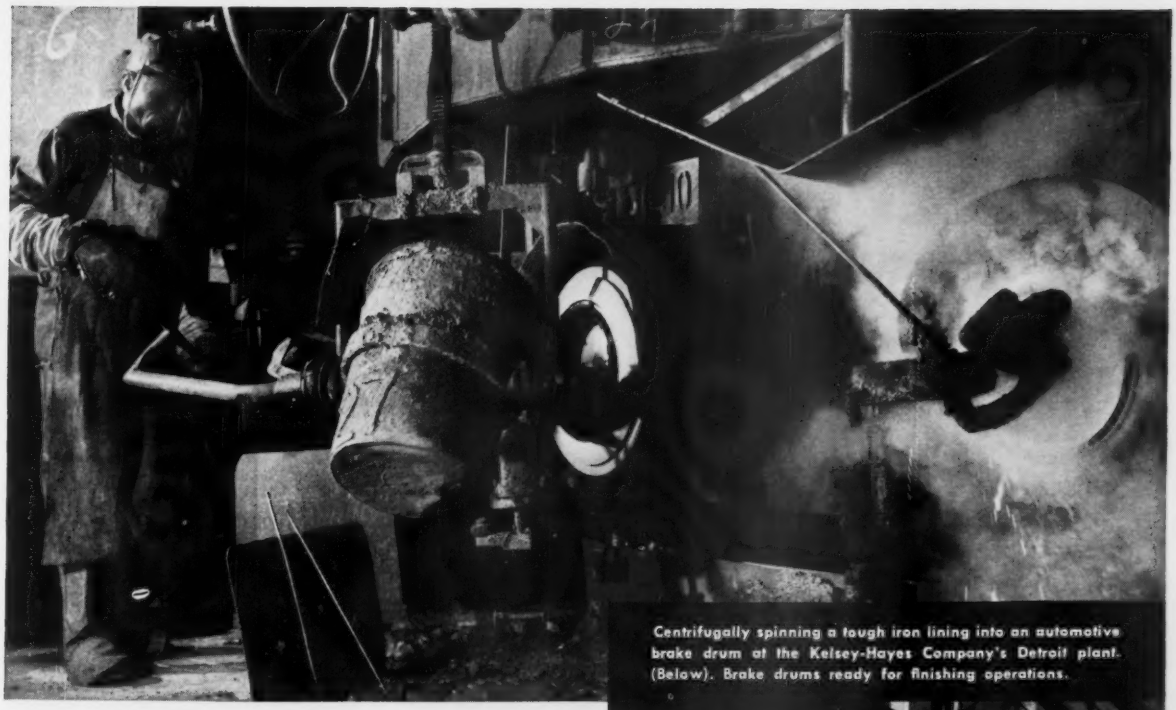
Other Experiments—In view of these drawbacks, we ran a number of experiments designed to remove oil by other means. None of these experiments was satisfactory.

Eventually, we turned again to thermal removal of the oil. After due deliberation, we concluded that a drum-type dryer could be used without hazard or nuisance if the amount of oil on the chips was held reasonably constant. An experimental program accomplished a substantial removal of oil with centrifugal separators, or chip wringers.

In this process, the chips are fed in batch lots into the basket of a chip wringer. Provision was made in the cover of the wringer to introduce steam and water. As the chips were spun, they were flushed first with a stream of cold water which re-



TITANIUM REDUCTION: Huge product removal machine loosens combination of salt and titanium sponge clinging to sides of a reactor at the Ashtabula, Ohio, titanium sponge plant of Electro Metallurgical Co., a division of Union Carbide & Carbon Corp. Operator at the control board at the right directs operation of the machine. Capacity production has been reached at the plant, first in the country to use the sodium-reduction process on a commercial scale in reducing titanium tetrachloride



Centrifugally spinning a tough iron lining into an automotive brake drum at the Kelsey-Hayes Company's Detroit plant. (Below). Brake drums ready for finishing operations.

Kelsey-Hayes casts longer wearing brake drums with Hanna pig iron

Kelsey-Hayes is a key supplier to the auto industry. One of its leading products is a brake drum with a centrifugally spun iron lining. Kelsey-Hayes also produces thousands of sand cast brake drums. Strict uniformity of each melt is of major importance to Kelsey-Hayes.

To maintain their high standards, Kelsey-Hayes uses thousands of tons of Hanna Malleable Pig Iron annually.

Kelsey-Hayes, like the many other Hanna customers, knows that for pig iron of high metallurgical quality and analysis, it can always depend on Hanna.

Hanna makes all regular grades of pig iron, as well as HannaTite and Hanna Silvery, available in two sizes—the 38-pound pig and the 10-pound HannaTen ingot. Hanna qualities contribute to the production of denser, stronger castings with uniform machining qualities. These features are particularly beneficial in HannaTite—a specially made iron, possessing extra-fine grain structure with smaller, uniformly distributed graphite flakes.

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Revolutionizes Sand Systems

the HARTLEY BOND FEEDER

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- TRANSPORTS
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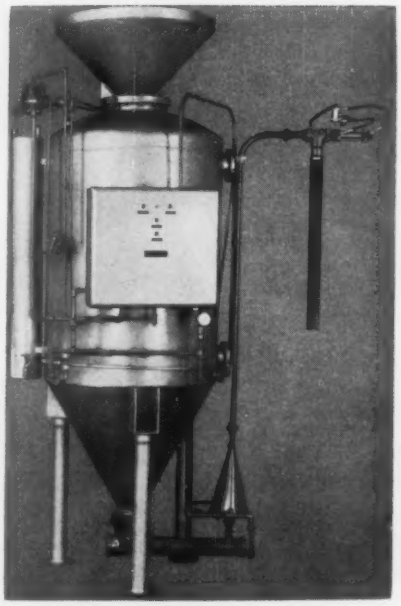
Hartley,—originator of automatic moisture controls for sand systems, invites inquiries on its newest development illustrated here. Hopper sizes start at 28 cu. ft. Bond is transported to mixer in precisely measured quantities which can be changed instantly. May be located at floor level, or below, any distance from mixer. Ideal for multiple mixing units operating from same hopper.



HARTLEY Controls CORPORATION

SPECIALISTS IN FOUNDRY CONTROLS

NEENAH • WISCONSIN

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machined all over and engineered to fit the needs of your foundry

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Anderson Pattern Inc.

MUSKEGON MICHIGAN

moved a large amount of oil and contamination. Toward the end of the cycle, the water was turned off and 90-psi steam admitted for about two minutes. The chips then were spun until substantially no effluent was visible. Chips centrifuged in this manner were found to contain a consistent residue of oil—from 2.1 to 2.3 per cent.

Drying Operation Controlled—Results of these tests indicated the solution to our drying problem. When we started with chips containing a low and reasonably constant percentage of oil, the final drying operation could be controlled.

We reasoned that a drum-type dryer could be used for this purpose if it was constructed in such a manner as to control both temperature and amount of air admitted. We further reasoned that no explosion hazard could exist if a controlled excess of air were admitted to the drum and that no smoke would ensue if instead of vaporizing the oil, we burned it in an excess of air at a controlled temperature.

Temperature control was essential also to prevent excessive oxidation of the chips. With these considerations in mind, a dryer was constructed using the conventional countercurrent principle. The combustion chamber was, so far as possible, sealed to the drum. Chips were charged into the drum through a hopper with a controllable opening into the drum.

Since the damper across this opening impeded the flow of the chips, an electric magnetic vibrator was installed on the bottom of the hopper. Finally, a blower was installed to furnish combustion air to the burner. Off the combustion air line, a bypass line with an orifice and a needle valve was fed into the drum above the burner.

This arrangement provided a controllable excess of air. Temperature control was provided automatically by a thermocouple at the flue. This thermocouple, in conjunction with a conventional pyrometer, was used to control a motorized valve on the combustion air line.

Helically arranged scoops were welded to the inside of the drum. In essence, then, we had a drum substantially isolated from air, furnished with a controlled source of heat and air and provided with means of stirring the chips and moving them through the drum.

Orderly Operation—This unit, in conjunction with the centrifugal separators, has been in operation continuously for the last six years. There has been no smoke, and we have had

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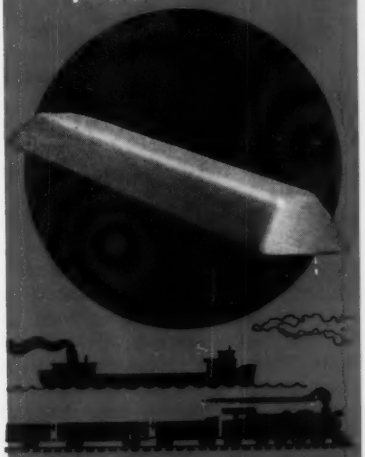
MELTRITE PIG IRON

Strictly Merchant



The entire production is *for sale* at all times. Always in dependable supply.

More used than any other merchant pig iron, MELTRITE is made to the required analysis to meet the specifications for many different grades.

SERVICE DEPARTMENT AVAILABLE WITHOUT OBLIGATION

Serving Industry Since 1883

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IRON ORE • PIG IRON
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no explosions. The chips have been dried so thoroughly that excellent magnetic separation has been attained. Iron pickup in the reclaimed metal has been negligible. Over 30 million lb of metal has been reclaimed since the equipment was started, and we feel that this process has been a success.

Shortly after the reclaiming operations had begun, however, a serious problem confronted us. We discovered that the roof of the plant in the immediate vicinity of the reclamation department was covered with very fine particles of aluminum. These particles combined with rain water to create a sort of metallic mud which did a thorough job of clogging downspouts and roof drains. Some of the mud found its way through the downcomers and created a similarly thorough mess in the sewers.

Immediate investigations disclosed that the fine particles of aluminum were being carried in the dryer air stream. A combination of air velocity and thermal velocity was sufficient to carry the particles up the flue and onto the roof.

After some experimentation, we solved the problem with a wet-type collector equipped with an arrangement to drip a wetting agent into the water bath. The wetting agent was necessary to prevent fine particles of aluminum from floating on the bath and being picked up in the exhaust stream from the collector. With the wetting agent, they form a sludge on the bottom of the collector, and a drag link conveyor removes the sludge.

Tramp Iron Removed—A flow sheet of the reclaiming facilities at Chrysler Corp. would show the incoming oily chips received in skid boxes approximately 3 ft wide, 4 ft long and 2½ ft deep. These boxes are dumped into a conveyor system containing magnetic separators to remove tramp iron.

The conveyor deposits the chips in a surge hopper which feeds two centrifugal separators. After centrifuging, chips are pneumatically conveyed to the dryer. The dryer discharges onto a bucket conveyor which feeds a double-deck vibrating screen.

This screen removes all particles less than 30 mesh. We found this minus-30-mesh material uneconomical to recover. The headings from the screen are discharged onto a permanent-magnet-type magnetic separator.

From there, the chips, dry and free of iron, are conveyed to large storage bins located above each of two twin-coil induction furnaces. Electro-

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MILWAUKEE SOLVAY is made from carefully selected coal purchased for one purpose only—to make the best foundry coke.

It is highly resistant to shatter and abrasion, consistently high in carbon and low in sulphur and ash, carefully screened to size, and always in dependable supply.

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Acco Registered® Sling Chains

NEW!
Shaped Section Master Link
Holds its form under loads up to 18% greater.
NEW!
Accoloy X-Weld 125 Chain
Welds as strong or stronger than alloy material. Welded area 2¼ times conventional size area.
*Pat. No. 2763768

New X-weld Chain and New Master Link give added strength, safety!

• The best has been made even better! ACCO *Registered* Sling Chains, recognized everywhere as the finest sling chains on the market, have now been made still stronger and safer by incorporating ACCO's great new Accoloy X-weld 125 chain and ACCO's new Shaped Section Master Link.

The Accoloy X-weld 125 chain is non-kinking. Each link has an oversize welded area with welds of full alloy strength. This means extra ruggedness and longer service life. Chain is identified at 5-foot intervals by tape markers reading "ACCO X-Weld Pat. No. 2763768." The new Shaped Section Master Link weighs no more, but it withstands deformation under loads up to 18% greater than a conventional round section can.

Next time you buy sling chains, get ACCO *Registered* Sling Chains—they are better than ever! For full details, call your ACCO *Registered* Distributor—or write our nearest District Office.

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2 Unit safety factor (on bodies, rings, links, hooks)
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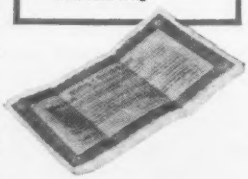

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magnetic-type feeders control the discharge from the storage bins and provide a controllable flow of material to the melting units.

With this arrangement chips are fed to the melters at exactly the same rate at which the metal is melted. This is important since the chips would oxidize readily if allowed to float on the molten metal. The metal is melted in batch lots running 1700 to 1800 lb per heat.

Before it is poured into ingots, each heat is fluxed with a chloride-fluoride base flux which presents an air pollution problem. A flux of this type gives off poisonous fumes which must be collected. For this purpose we installed a wet-type collector, and no difficulties with this system have been encountered.

Dross Skimmed—During the fluxing of the metal in the induction furnaces, an amount of dross is formed on the surface of the metal bath. This dross is skimmed from the metal with perforated ladles and collected in refractory-lined buggies with a taphole in the bottom.

The dross buggies are wheeled under a hood, and the dross is thoroughly rabbled. Exhaust from this hood is connected to the furnace exhaust system. After sufficient stirring has coalesced the small particles of molten metal in the dross, the taphole in the bottom of the buggy is opened and the resulting molten metal is collected in a mold. This metal recovered from the dross is fed back into the induction furnaces for further refining before being poured into piston ingot.

As outlined above, the operations are continuous in nature, with no provisions for checking weights of material at the various stages of processing.

We do, however, run a weight check throughout the system periodically. Average figures from such a check show that chips as received in the reclamation department contain about 21 per cent liquids. The liquids present are oil and water. After centrifuging and drying, the dry chips contain about 1.50 per cent fines less than 30 mesh and 0.30 per cent iron. Hence, the dry, iron-free chips represent about 77 per cent of weight as received.

A breakdown of metal recovery in the melting operations shows that we recover from 94 to 96 per cent of the weight of the dry chips. Of this amount some 6 per cent comprises metal recovered from the dross. We use an average of 1 per cent flux in the refining operations. Ash resulting from dross recovery is discarded.

Long-Range Tax Planning Can Help Your Business

Small Firms Can Achieve Substantial Tax Savings

LONG-RANGE tax planning in today's business world of high tax rates is no longer "big business foolishness." Last-minute tax worrying with no year-around tax thinking can result in the loss of sizable savings for small and medium-sized businesses when it comes time to file a tax return.

For example, assume that last summer you were forced to replace your air conditioner. You shopped around and found you could either sell your old unit to a private party for $500, or a dealer in town would give you a trade-in allowance of $500 on it. That seemed like six-of-one-half-a-dozen-of-another to you; so without thinking—or worrying—about tax matters you traded in the old air conditioner.

To prove how such a seemingly simple business decision such as this can affect how much tax you will have to pay, let's assume further that the air conditioner which you traded had originally cost $2500 and that you had taken $1000 in depreciation on it. This meant its cost for tax purposes was $1500, and you were going to "lose" $1000 whether you accepted the dealer's trade-in allowance of $500 or sold to the private party for $500.

So far still six-of-one-half-a-dozen-of-another, but now, since you elected to trade in your old air conditioner, let's see how you can claim a deduction on a tax return for your $1000 loss. The answer is simple. You can't. All you can do is add the amount of the loss to the cost of your new unit and eventually receive tax credit for your loss in the form of slightly higher depreciation deductions.

On the other hand, if you had made a bona fide sale of your old unit to the private party and a separate purchase of a new unit from a dealer, you would have established a $1000 loss which could be claimed as a loss deduction on a tax return and used to offset regular income.

Sell or Trade?—It is not always true, of course, that a loss deduction on the tax return is worth two in the bush of depreciation. but a general rule to consider when you are trying to decide whether it would be more advantageous taxwise for you to sell or trade in an asset is: Sell "loss" property to obtain a deduction, and trade "profit" property to avoid the tax which must be paid on any profit realized from the sale of an asset.

You may find that you have sold yourself into a capital gains tax or traded yourself out of a loss deduction if you have not figured your depreciated costs correctly. This is a matter you should discuss with a certified public accountant. Not only can he verify the accuracy of your mathematical computations, but he also can explain the advantages and disadvantages of the various methods used to compute depreciation. It could be that the method you used or are using is not the one most suited to your business needs, from a tax standpoint.

For example, if you asked a CPA whether you should use the straight-line or declining balance method to depreciate your new air conditioner, one of the first questions he might ask you would be: What are your cash requirements and what are your profits likely to be? If you are thinking of expanding and need additional cash within the next few years, he might recommend that you use the "new" declining balance method to compute depreciation.

Speeds Up Depreciation—The declining balance method "speeds up" or increases depreciation rates. This starts the chain reaction to your objective of retaining cash in the business because when you increase depreciation rates, you also increase allowable depreciation deductions on your tax return. The amount you may write off the first year is twice what it would be if you used the straight-line method. So by applying a $1000 instead of $500 depreciation deduction against your regular income, you are going to reduce your taxes, and cash that does not have to be paid out in federal taxes can be retained in the business for expansion purposes.

It seems, however, that all good things eventually come to an end. Although in the first year the declining balance depreciation rate may be double that of the straight-line, this differential diminishes in succeeding years until declining balance deductions are even less than they would be under the straight-line method. This is why it is important that you consider current and future earnings before you select a depreciation method.

For example, if your current earnings are low, or if you are putting in a new line of merchandise and the results of this expansion will take a few years to show in your

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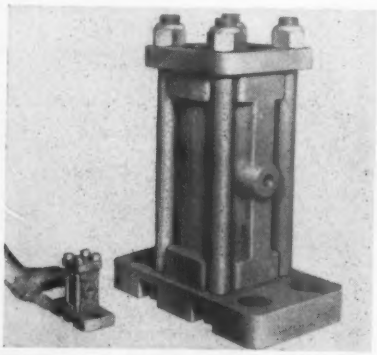

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earnings, it might be more advantageous taxwise for you to use the straight-line method of computing depreciation.

Deductions Spread Out — The straight-line method does not "speed up" depreciation deductions. It spreads them out equally over the estimated useful life of the asset; so when you use a straight-line method you are saving, in a sense, for a rainy day. When your earnings improve or increase, you will have more substantial depreciation deductions to apply against those earnings. There usually is no point in increasing a loss or reducing low earnings by claiming additional depreciation deductions when you do not need them.

A point to remember when you are trying to decide whether to buy new or used equipment is that second-hand equipment *must* be depreciated by the straight-line method. This tax factor should be considered, because loss of the opportunity to use the declining balance method with its rapid write-off feature may cancel any immediate savings effected by the purchase of used equipment.

When To Incorporate—The matter may have been decided and forgotten many years ago, but a basic question businessmen should consider from time to time—and one which has many tax implications — is whether to do business as a proprietorship, partnership or corporation. There may be personal or professional factors that force the selection and maintenance of a noncorporate form of organization, but, depending on the earnings of the business and the amount of those earnings you may need to withdraw, there are certain tax advantages to be gained by incorporating a new or expanding company.

Since proprietorship and partnership income is taxed at individual rates, which range anywhere from 20 to 91 per cent, and corporation earnings are taxed at corporate rates of 30 per cent on the first $25,000 earned during the year and 52 per cent on the excess, it might appear that if you have relatively low income the proprietorship-partnership rates are lower. However, you must also consider that the corporate tax carries with it the privilege of deducting a reasonable salary paid to an employee-owner. The employee-owner has to pay a personal tax on his salary, of course, but if he were not incorporated, he would have to pay a personal tax on all the money earned by the business.

If the retained earnings of the company are taxed at a corporate rate which is lower than what the personal tax rate would be, the employee-owner would benefit by having additional funds available in the corporation for expansion purposes. These funds may be accumulated in a corporation up to $60,000 without further tax penalties, and even higher if the need can be proved.

Review Requirements First—These advantages—although they may cut your current tax bill and increase working capital for expansion needs —can be lost if you have jumped into a corporation without first reviewing your own long-range cash requirements. If you continually are forced to withdraw money from the corporate earnings to pay personal expenses, you will have to withdraw these funds in the form of dividends. That means the corporation will have to pay tax on the earnings you are withdrawing as dividends, and you will have to pay tax on the dividends received. The "double tax" on earnings and dividends can nullify any tax advantage from incorporation when earnings must be withdrawn immediately as dividends.

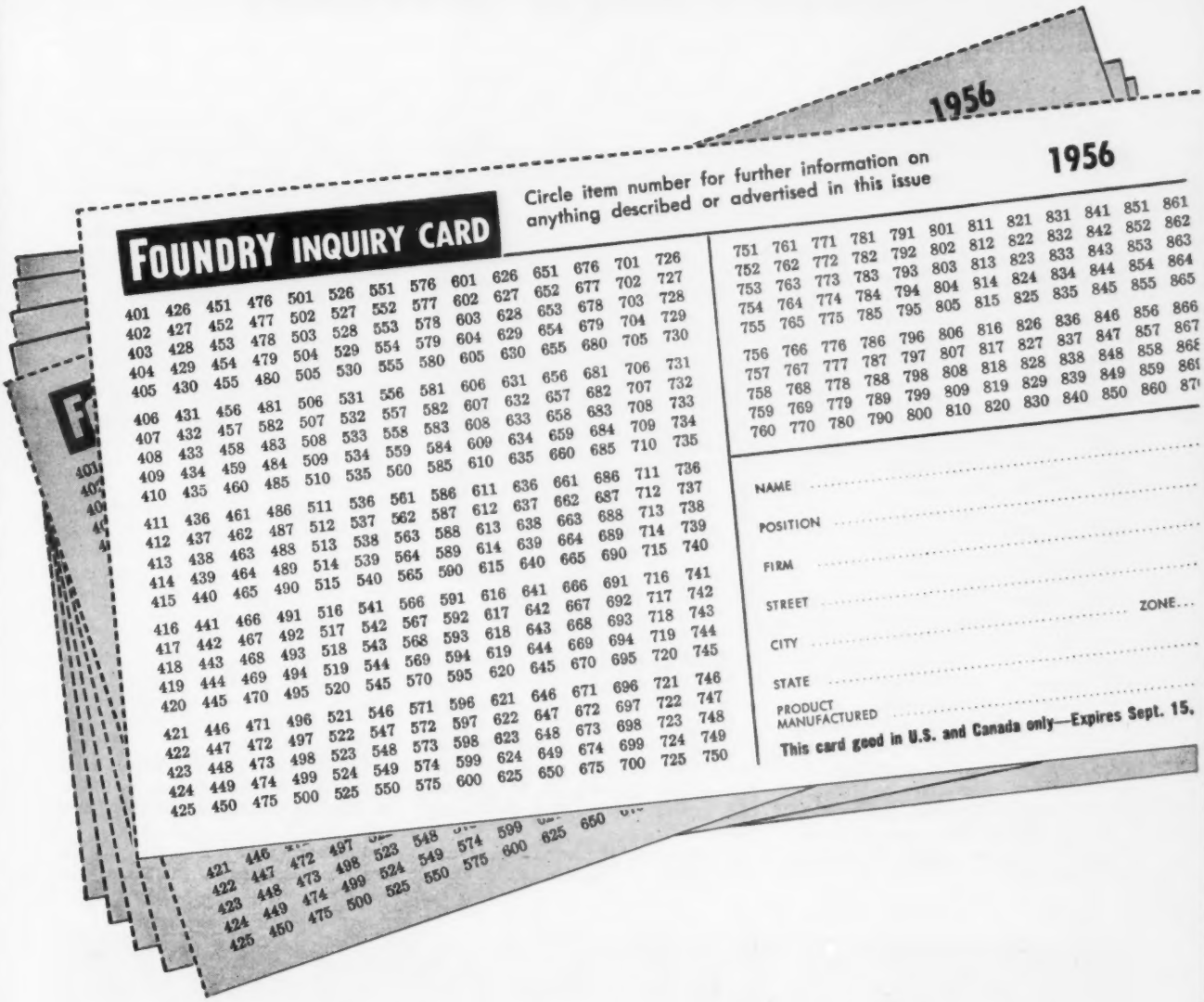
Many businessmen seek professional advice about tax matters as they do professional assistance with their golf game—when the slice has become almost unbearable. You can save tax dollars by realizing that business decisions made in the fall affect the amount of tax you must pay in the spring. Practice year-around tax thinking, and consult a certified public accountant when you are in doubt as to the tax effect of even the most routine decision.

Editor's Note: This article is based on information supplied by the American Institute of Accountants, the national professional organization of certified public accountants, and checked for technical accuracy by the Internal Revenue Service.

Publishes Booklet on Plant Rehabilitation after Disaster

The Technical Societies Council of New Jersey Inc., Newark, N. J., has published a booklet containing reports on five papers on plant rehabilitation after a disaster. Presented last year at the sixth annual conference of the council, these papers include "Disaster Control Planning," "Tornado Disaster Control," "Trial by Fire," "Mud, Men and Machines" and "The Role of the Federal Government at Time of a Disaster."

Copies are available at 50 cents each from O. O. Miller, secretary, Technical Societies Council of New Jersey Inc., Research Laboratory, International Nickel Co., Bayonne, N. J.



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FOUNDRY

Foundry Group Meetings

Utah: The AFS chapter was installed officially as the newest member of the national organization on Jan. 21 at Salt Lake City, Utah, when William W. Maloney, general manager, AFS, presented the traditional cast iron rattle to Arthur S. Klopf, manager of marketing, American Gilsonite Co., chapter chairman.

Frank Shipley, president, AFS, welcomed the group into AFS as the largest starting chapter in the last ten years. He spoke briefly of the benefits that would accrue to the 101 new members.

E. J. Nelson, general manager, Pacific States Cast Iron Pipe Co., told the group that the day of guarding trade secrets has passed and stressed the sharing of information with fellow foundrymen.

D. N. Rosenblatt, chief metallurgist, American Foundry & Machine Co., and 2nd vice chairman of the chapter, discussed three levels of technology as they affect present day foundries. On the first level, a substantial portion of foundry technology has its origin in pure science. Here are found the theoretical physicists, organic chemists, metallurgists, mathematical economists and others developing new horizons in progress.

On the second level, there is growing a rather impressive middle ground of technology. Here are the technical societies, manufacturers of equipment with their research, development and educational facilities available to the industry, sales engineers who act as competent technical advisors, management consultants, and independent research and engineering organizations. In foundries, industrial engineering departments, methods departments and quality control are initiating new practices and processes.

On the third level, the foundry workers face harsh reality on the proving ground of practicality where a mathematical equation must be blended skillfully with the human equation. Mr. Rosenblatt discussed what is happening today in foundries on all three levels and forecast what is in store for the foundry of tomorrow.—*J. Merrill Bushnell, Pacific States Cast Iron Pipe Co.*

Quad City: About 100 persons attended the Jan. 21 meeting of the AFS chapter at the Fort Armstrong Hotel, Rock Island, Ill. Rex Jennings, superintendent, John Deere Waterloo Tractor Works, was technical chairman. Speaker was J. McConville, also of the John Deere Waterloo plant.

A report on the development and conversion of regular cupolas to water-cooled types, a breakdown of the maintenance required and operation of the cupolas was given. All cupolas in this plant have been converted to water-cooled type. Melting rate is a reported 25 per cent greater than the regular type cupola, and refractory consumption dropped from 25.7 lb per ton of melt to 12 lb. A greater and more uniform carbon pickup is claimed for the water-cooled cupola with an accompanying greater loss in silicon. Limestone consumption has been reduced and the slag runs close to neutral. — *William Ellison, Thiem Products Inc.*

Pittsburgh: A large group of AFS members gathered in Webster Hall, Pittsburgh, Jan. 21, to hear Clyde A. Sanders, vice president, American Colloid Co., Chicago, talk on "Casting Finish, Tolerance and Precision." Mr. Sanders gave his opinion on the use and misuse of green sand molding mixtures and offered comparisons between the C, D, high-pressure and green sand molding methods.

The speaker offered several considerations for foundrymen to follow in selecting a process for their own use:

1. Know what all costs will be, including equipment. 2. Know cost

NEWEST ADDITION: The Utah chapter, AFS, was initiated officially into the national organization when the traditional cast iron rattle was presented to the group at a special ceremony at the January meeting. The photograph above pictures the members of the group who attended the initiation meeting

of finished mold. 3. Know now much precision is required in the casting. 4. Know what controls must be established to make the process work and whether an average foundryman can supervise the operation. 5. Know if a competitive process can make castings for lower cost. 6. Be aware of the cost of removing some excess metal. 7. Discover whether the castings will have to be welded or straightened. 8. Know how many castings will be required per week. 9. If adding to existing foundry, be sure there is adequate space. 10. Know what cleaning process will be used.—*Robert M. Love.*

Northern California: Largest meeting of this AFS chapter was held Dec. 15 when, following dinner, the General Metals Corp., Metals Division, conducted the group on a visit to its East Oakland, Calif., foundry, the largest of its type in the West. Thirty-five General Metals staff members guided 226 chapter members on the tour and explained the operations of both the steel and iron foundries.

Credit for the success of the visitation goes to William E. Butts, president; Philip Thayer, vice-president and general manager; Philip McCaffery, plant manager and John Schaeffer, manufacturing manager, all of General Metals.—*J. M. Snyder, Joseph Musto Sons-Keenan Co., Abrasive Division.*

Birmingham: James H. Smith, general manager, Central Foundry Division, General Motors Corp., discussed the "Future of the Foundry Industry in America" at the January meeting of the AFS chapter. His talk was illustrated with movies showing latest developments in the corporation's foundries. Newton H. De-Bardeleben, president, De Bardeleben Coal Corp., was the coffee speaker and traced the growth of his company from its inception to its present position.—*J. R. Cardwell, Stockham Valves & Fittings.*

Texas: "Magnesium Foundry Practice" as presented by M. E. Brooks, foundry engineer, Dow Chemical Co., Bay City, Mich., attracted 120 AFS members to the chapter's Jan. 18 meeting at the Statler-Hilton Hotel, Dallas, Tex. The technical session was presided over by Elmore C. Brown, Whiting Corp., Houston, Tex., program chairman of the chapter.

Mr. Brooks' talk was confined to the sand casting of magnesium and traced the development of magnesium casting from the early 1920's to last

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year's production volume of 16 million lb by about 75 foundries. General melting practices were described as were pouring techniques, fluxing practices, sand requirements and gating, risering, inspection, testing and fire prevention procedures.

During the question-and-answer period it was established that the price of a magnesium casting is influenced very little by the cost of the metal. The cost is determined by the "know-how" of the foundry and the inherent manufacturing cost that goes into the production of a particular casting.—*C. Eugene Silver.*

Chicago: Four roundtable sessions provided the technical program for more than 210 members and guests of the AFS chapter who attended the Feb. 4 meeting at the Chicago Bar Association. Chapter President Robert P. Schauss, Chicago manager, Werner G. Smith Inc., presided.

Donald E. Meves, research metallurgist, American Steel Foundries, chairman of the educational committee, detailed the educational program to be conducted in March.

The Chapter's March 4 regular meeting will constitute the kickoff on the three-session educational course on "Sand." At this meeting Jerome R. Young, senior process engineer, foundry division, Cadillac Motor Car Division, General Motors Corp., Detroit, will discuss the "Automated Sand System," and set the pattern for sessions to follow.

At the second session at the Peoples Gas Auditorium on March 11, Earl E. Woodliff, consultant, Foundry Sand Engineering Co., Detroit, will discuss "Sand Control Through Binder Selection." Third and concluding session on March 18 at same location will be devoted to "Sand Reclamation." R. L. McIlvaine, executive vice president, National Engineering Co., Chicago, will deal with the pneumatic method; Robert K. Strong, vice president, Hydro-Blast Corp., Chicago, the wet process; and William Ellenberger, Nichols Engineering & Research Corp., New York, the thermal process.

Howard H. Wilder, manager, iron foundry division, Vanadium Corp. of American, Detroit, addressed the Gray Iron Division roundtable on "Practical Inoculations of Gray Iron." Speaker at the roundtable in which the Malleable Iron, Steel and Pattern divisions collaborated was Robert J. Franck, Superior Steel & Malleable Castings Co., Benton Harbor, Mich., and his subject was "Design and Application of Malleable and Steel Castings."

"Nonferrous Gating and Risering" was the subject which Fred L. Riddell, foundry metallurgist, H. Kramer & Co., Chicago, discussed at the Nonferrous division roundtable. The Maintenance and Engineering division heard Robert Schadt, consultant and application engineer, Westinghouse Electric Corp., Chicago, speak on "Electrical Equipment for Foundries."—*Erle F. Ross.*

Ontario: H. J. Weber, director, Safety, Hygiene and Air Pollution Control, AFS, talked on ways and means to "Make the Foundry a Better Place to Work," at the Jan. 19 meeting of the AFS chapter at the Royal York Hotel, Toronto. Alex Pirrie, American-Standard Products (Canada) Ltd., was technical chairman of the meeting.

Mr. Weber outlined the importance of making foundries more attractive and safer to benefit management, the employee and the community. Air pollution and hygienic control systems will be required by legislative action in the near future and these installations will be quite expensive. Foundries can improve their community relations if they will tell the community of the advancements they are making in controlling noise, dust and smoke and providing better working conditions for employees.—*J. K. Senior, Canadian General Electric Co. Ltd.*

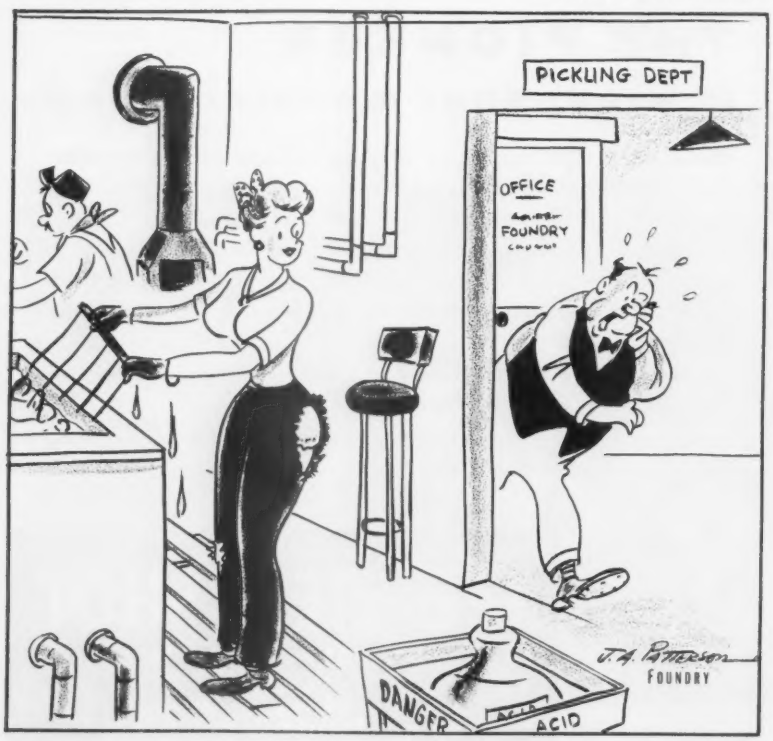
Southern California: About 140 members and guests of the AFS chapter met at Rodger Young Auditorium, Los Angeles, on Jan. 11 to hear Michael Bock II, vice president. Exomet Inc., Conneaut, O., discuss "Gating — Risering — Feeding" with emphasis on the metallurgical and economic values of using exothermic compounds.—*Harold Simmons, AiResearch Mfg. Co.*

Northeastern Ohio: About 170 members and guests of the AFS chapter met at Tudor Arms Hotel, Cleveland, on Jan. 10 and heard Charles Schureman, foundry sand consultant, Green Valley, Ill., talk on "How About Becoming Sand Conscious!"

Various committee chairmen reported on activities of their respective committees. Walter Sicha, Aluminum Co. of America, introduced seven engineering students from Case Institute of Technology who are scholarship holders from the Foundry Educational Foundation. All the students are juniors and seniors who will enter the foundry industry upon graduation.

Mr. Schureman confined his remarks to synthetic sands and continually emphasized that too many foundries pay too little attention to

GANGWAY! BY J. A. PATTERSON



"I came back to warn you to be very careful of that acid . . . . It will eat the very seat out of . . . . Eeeeek!"

the sand mill. Success at the sand mill depends upon its operation by a well-trained, skilled operator, a rigid inspection program to see that proved formulas are followed exactly, accurate weighing of all ingredients, proper mixing in correct order and daily cleaning and servicing of the unit.

The speaker urged foundries to make sure their sand mixes are correct on paper and then to make sure they are made that way in the muller. When properly mixed, sand won't need controls. If not mixed properly, controls will not be needed because it is too late.

Much attention and study must be given to the choice of the base sand, choice of bonding clay, equipment and methods, in addition to the vital mixing operations, if the foundry industry is to continue progressing and producing a consistent, quality product.—*Kenneth L. Mountain.*

Wisconsin: The AFS chapter met Jan. 18 at Hotel Schroeder, Milwaukee, and heard William H. Johnson, Battelle Memorial Institute, Columbus, O., speak about "Gating—First and Always," He summarized the results of several research studies on gating systems with the aim of developing simple working concepts applicable to practical gating design.

Slides and movies were shown emphasizing the importance for foundrymen to understand how certain basic physical laws of hydraulics affect volume rates and velocity of flow of metal into the mold cavity. Understanding of these principles should enable the foundryman to solve any specific gating problem.—*John E. Hubel.*

Chesapeake: The AFS chapter's ninth annual oyster roast was held Jan. 19 at the Alcazar, Baltimore, with 335 members and guests attending. At the regular technical meeting Jan. 25, Frank Loewy, General Grinding Wheel Co., talked on the safe handling of grinding wheels with emphasis on the "dos" and "don'ts" essential to safe practice. Mahlon A. Winter, Glenn L. Martin Co., Baltimore, spoke on the satellite Vanguard and took the members on an imaginary trip to outer space. He also showed a sound film, "Horizon Unlimited."—*Joseph O. Danko Sr., Danko Pattern Co.*

Washington: Michael Bock II, vice president, Exomet Inc., Conneaut, O., discussed "Insulating and Exothermic Material - Aids To Better Feeding," at the Jan. 17 meeting of the AFS at the Engineers Club,

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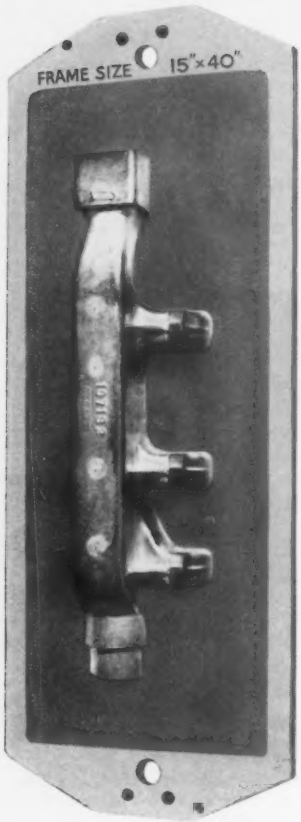

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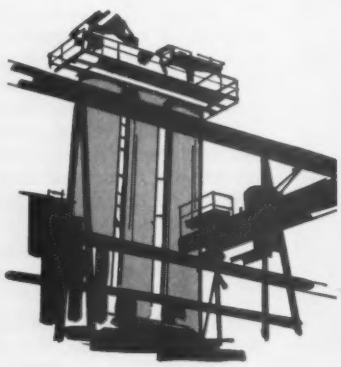

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Seattle, Wash. Forty-four members and guests attended.

Mr. Bock analyzed the solidification of metal and the effects of insulating and exothermic materials. He stated that solidification is a problem in heat loss. The heat loss from the top of the riser is radiation loss while the loss from the side of the riser is conduction loss. With charts and slides he showed that as riser diameters increase radiation loss increases.—*E. F. Riedle, Puget Sound Naval Shipyard.*

Philadelphia: "Casting Finish, Precision and Tolerance" was the subject of an afternoon-evening symposium-technical session of the AFS chapter at the Engineers Club, Philadelphia, Jan. 11. Symposium panel members were Dr. Fred J. Donkerly, Rolle Mfg. Co.; Clyde A. Sanders, American Colloid Co.; C. W. Mooney Jr., Link-Belt Co., and Edward Berry, Dodge Steel Co. B. A. Miller, Crown Non-Ferrous Co., acted as moderator.

In the evening, Mr. Sanders, with the aid of slides, showed the group how to obtain maximum casting results from naturally bonded sands. He emphasized that all casting defects are not caused by sands. Technical chairman for the meeting was F. Stevens, Bethlehem Steel Co.—*E. C. Klank, Philadelphia Coke Co.*

St. Louis: John G. Kura, chief of research, nonferrous metallurgy division, Battelle Memorial Institute, Columbus, O., brought the inside story of gating to the January meeting of the AFS chapter by showing a film, "A Story of Vertical Gating Design." The movie shows the development of a vertical gating system by observing the flow of water in transparent plastic molds. The effect of gating design on turbulence is studied in detail.

Findings observed in the plastic molds have been confirmed by x-ray photographs of actual metal pouring in similar gating.—*Ralph E. Johnston, East St. Louis Castings Co.*

San Antonio Section: Twenty-one members and guests attended the AFS chapter meeting at Alamo Iron Works, San Antonio, Tex., on Dec. 17. A general discussion on proper gating of castings was held and a motion picture, "Sand," furnished by Whitehead Bros. Co., was shown. C. G. Nelson resigned as vice chairman of the chapter and William Merkle, Kincaid-Osburn Electric Steel Co., will succeed him. Refreshments were served by Kincaid-Osburn Electric Steel Co.—*Kenneth E. Kielty, Alamo Iron Works.*

Compares Fatigue Properties Of Cast and Wrought Steels

Steel Founders' Society of America, 606 Terminal Tower, Cleveland 13, O., is offering free individual copies of "Fatigue Properties of Cast and Comparable Wrought Steels," a paper presented at the 59th annual meeting of the American Society for Testing Materials in Philadelphia.

Written by E. B. Evans, L. J. Ebert and C. W. Briggs, the paper covers effects of steel composition, heat treatment, surface finish, directionality and section size on these steels: Cast and wrought 1040 carbon steel, four low-alloy cast steels (1330, 4135, 8630 and 8640) and four low-alloy wrought steels (1340, 4140, 4340 and 8640). In all, 11 heats of cast steel and 8 of wrought steel were studied.

In the low-alloy series, the cast steels deliberately were made with a lower carbon content to match the physical properties of the wrought steels at the 0.40 C level. The major portion of the paper therefore is devoted to a comparison of cast and wrought steels with comparable mechanical properties rather than on the basis of chemical analysis.

Two-Day Conference Will Study High-Temperature Materials

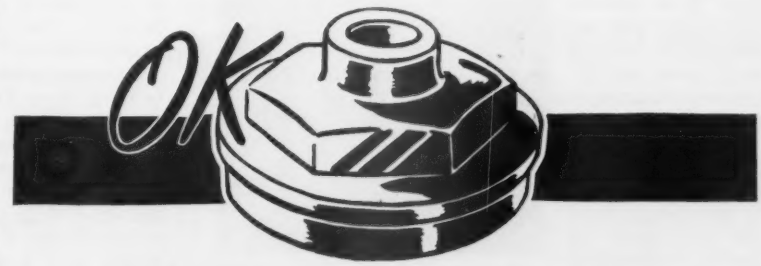
A two-day conference on high-temperature materials will be held April 16-17 at the Hotel Carter, Cleveland, under sponsorship of the Cleveland section, American Institute of Mining, Metallurgical and Petroleum Engineers, in co-operation with the High-Temperature Committee, Institute of Metals Division.

Subjects of papers and discussions will include cobalt, nickel, chromium and molybdenum-base alloys; refractory metals, SAP-type materials, cermets and hard metal compounds; ceramics; graphite; methods of testing; effect of atmosphere on high-temperature properties; and effects of vacuum melting and casting on properties.

Offers Quality Control Course At University of Illinois

The tenth annual short course in quality control by statistical methods will be offered Mar. 11-21 by the College of Engineering, University of Illinois, with the co-operation of the Division of Engineering Extension at Urbana.

Intensive work will be given in the fields of control charts and acceptance sampling, with some attention paid to the rational setting of specifications and tolerances. The course is designed for individuals in areas of design, production, procurement, management, quality control and inspection. For further information, write to Prof. John A. Henry, Mechanical Engineering Laboratory, University of Illinois, Urbana, Ill.



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The Shakeout

Blowpipe Capable of Removing Large Risers

WORKING ALONE, the operator shown here removed this 48 x 120-in., 120,000-lb riser in 4 hours. He used the Oxweld C-63 Blowpipe developed by Linde Air Products Co., division of Union Carbide & Carbon Corp., New York, which is said to remove quickly the largest risers required on steel castings. It is capable of cutting steel as thick as 55 in. in a single pass, and far greater thicknesses can be cut.

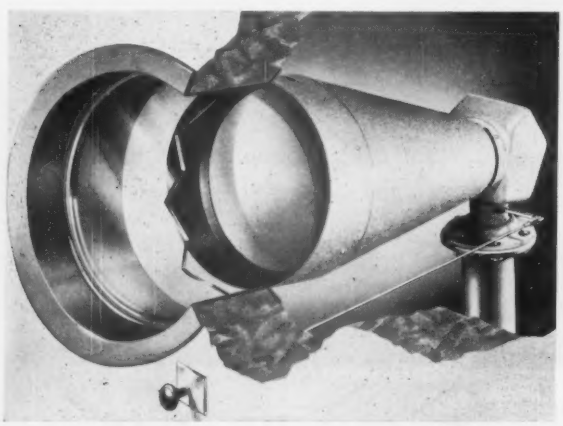
The blowpipe applies a tremendous amount of preheat to the surface to be cut and needs no auxiliary preheat. A specially designed head locates the blowpipe nozzle off center from the center line of the unit. This arrangement permits the operator to widen the kerf uniformly, simply by rotating the blowpipe. Once the kerf has been widened, the blowpipe itself can be inserted into the kerf to deepen the cut. A cartridge-type mixer assures thorough mixing of gases.

For More Details Circle No. 447—Page 225

Viewer Permits Furnace Electrode Observation

VIEWER designed by engineers of Instrument Division, American Optical Co., Buffalo, N. Y., permits safe, maximum observation, through optical means, of the travel of the electrode in consumable arc furnaces. It was custom designed for Electro Metallurgical Co., Niagara Falls, which has two in operation in connection with the laboratory arc melting of several metals, including titanium.

The viewer fits over the viewing port of the furnace

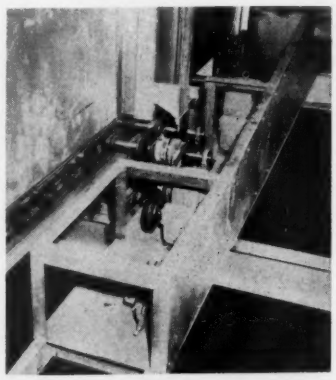


so that the operator can stand safely outside a concrete barrier and study the image of the electrode on an 8-in. ground glass screen through a safety glass window. The electrode can be followed visually from about 1 ft downward to a maximum of 10 ft. Image size varies from about 1½ in. at 2-ft to about 6 in. at 4 or 5 ft.

For More Details Circle No. 448—Page 225

Drive System Aids Heat Treatment of Castings

CONVEYORIZED, tunnel-type heat treating oven for aluminum castings can take a maximum load of 65,000 lb. Production rate is about 150,000 lb of castings in 24 hours. The oven is 140 ft long.



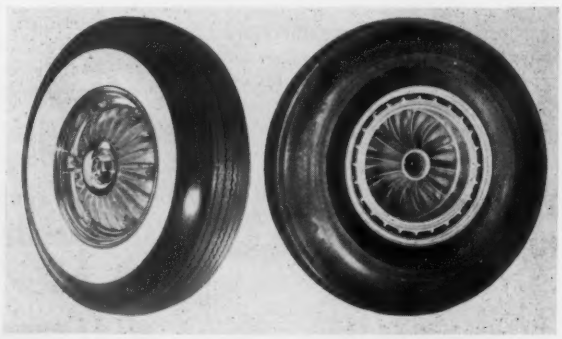
Completed recently by J. King Kent & Co., St. Louis, for a prominent firm, the unit incorporates a system of drives and drive equipment produced by Fort Worth Steel & Machinery Co., Fort Worth, Tex. These products make possible precise, easily variable driving of the sections of roller conveyor which move castings into, through and from the oven.

Speed can be varied and controlled so that parts move through the oven in various selected periods of time.

For More Details Circle No. 449—Page 225

Die-Cast Aluminum Wheel Is Integral Unit

AN ALUMINUM WHEEL to be die cast as an integral unit, including hub and brake drum (shown on right), has been developed by Kaiser Aluminum & Chemical



Corp., Chicago. It is reported to make possible improved brake performance, greater strength and light weight. Tests are said to indicate that it reduces brake fade.

Complete with 14-in.-diam steel rim, the die-cast wheel weighs 30 lb. The braking surface of the wheel can be a metallurgically bonded iron liner, a cast-in iron liner or a metallurgically bonded metal spray liner.

In manufacturing, the die casting method permits mass production on an economically practical basis and permits many styling variations.

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Euclid cranes in a wide variety of types and capacities are well established in many foundries.

Long periods of dependable, trouble-free service constitute their strongest recommendation.

Precision load control with dirt and dust free mechanism make them highly regarded.

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We can build any foundry crane required. A phone call or letter will put our services at your disposal.

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Circle 745 on Inquiry Card—Page 225

NOW! POSITIVE MOISTURE REMOVAL
FROM COMPRESSED AIR LINES WITH THE
MURPHY AFTERCOOLER SYSTEM

The Murphy AfterCooler System guarantees the elimination of water in all compressed air line installations. Installation is simple and unit requires a minimum of maintenance. For cool, clean, dry air . . . for eliminating "down time" in compressed air operated tools and equipment . . . install a Murphy AfterCooler System in your plant now!

Write today for Bulletin No. 1, outlining complete details on the Murphy AfterCooler System!

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Separator removes all moisture and delivers dry air to lines.

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Trap eliminates moisture without loss of pressure or air leakage.

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Circle 746 on Inquiry Card—Page 225

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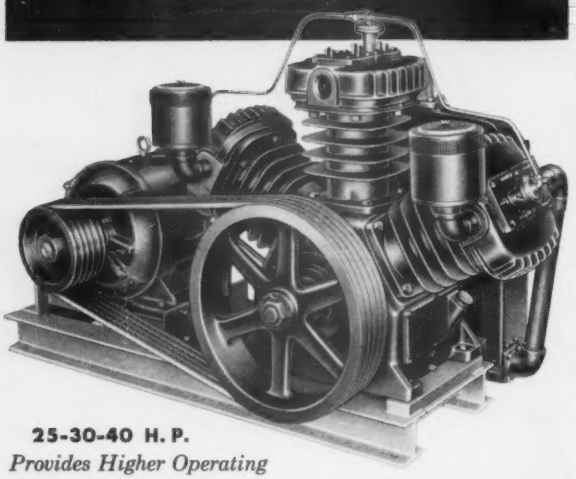
Two-Stage, Air-Cooled Air Compressor

Delivers *MORE* Air...

MINUTE HORSEPOWER *PER* KILOWATT HOUR OF ELECTRICAL ENERGY CONSUMED



25-30-40 H. P.

Provides Higher Operating Efficiency Costs Less to Install

The Curtis Two-Stage Compressor assures a saving in your power costs. It's air cooled, thereby eliminating expensive water bills—quick and easy installation with no complicated plumbing problems.

The new C-100 embodies all the well-known Curtis engineering features such as centro-ring oiling and Timken Main Bearings.

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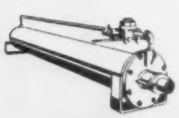
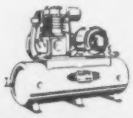


AIR HOISTS
AIR CYLINDERS



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on the new WATER-COOLED Model M-WC
(Illustrated)

Utilizes low cost permanent molds of available steel tubing to produce gray machinable cast iron or bronze bushings. Water cooled molds can be maintained at either high or low temperature easily. High or limited production in very small space with unskilled labor. Completely safe for workmen. Simple, sturdy equipment. Quick changeover from one mold to another. Practically 100% metal yield of high quality, denser castings. Metal porosity eliminated.

Write for new Bulletin # 153 Illustrating Model M-WC

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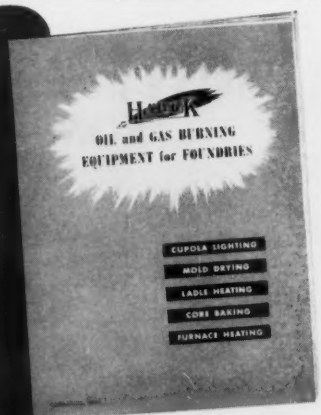
Circle 748 on Inquiry Card—Page 225

How to Reduce Costs in

- Drying
- Heating
- Baking
- Firing



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for the asking

Here's your easy-to-use guide to the selection of oil or gas burners, torches and heaters. It will help you improve operations in mold drying, ladle heating, cupola lighting, preheating furnace linings, core baking, firing melting and annealing furnaces, thawing and drying coal and sand, preheating for welding and other plant services. Yours for the asking—no obligation.

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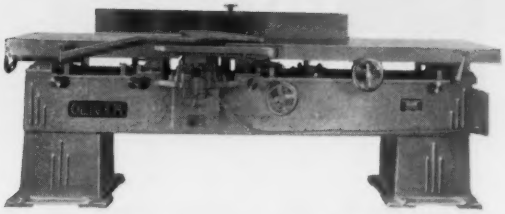
Save time! Cut perfect glue joints... plane draft on pattern lumber with this OLIVER



Here's one important reason why this Oliver is the patternmaker's favorite: The front table tilts sideways up to 5° to plane draft on lumber. The No. 12 Jointer makes easy work of planing long and short pieces of lumber. Tables adjustable for ¾" cut. Fence is adjustable from square to 45° across table. New rabbeting attachment. Sturdy cabinet columns eliminate vibration. Three sizes: 20, 24, 30 inches wide. Write for Bulletin No. 12.

Oliver also makes Heavy Jointers in 12" and 16" sizes, and heavy-type Jointers in 6" and 8" sizes.

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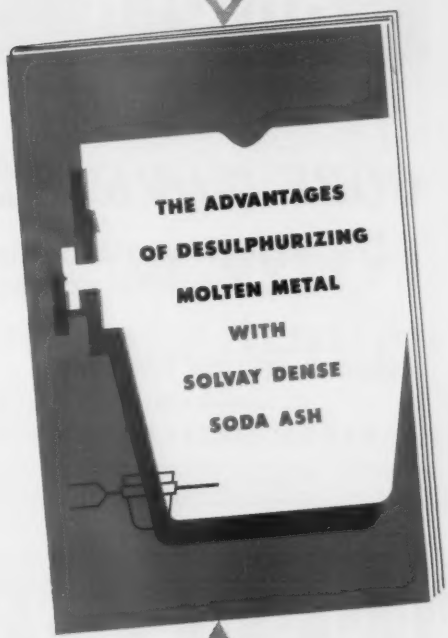

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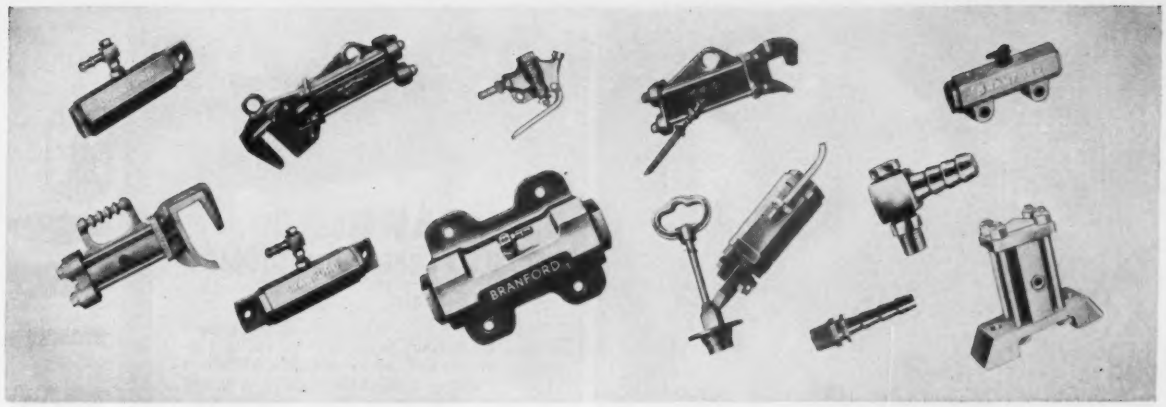

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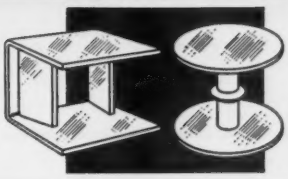

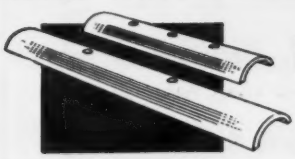

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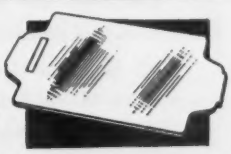

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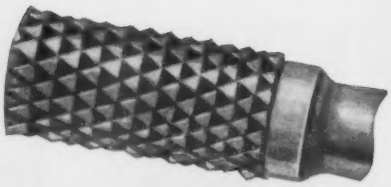

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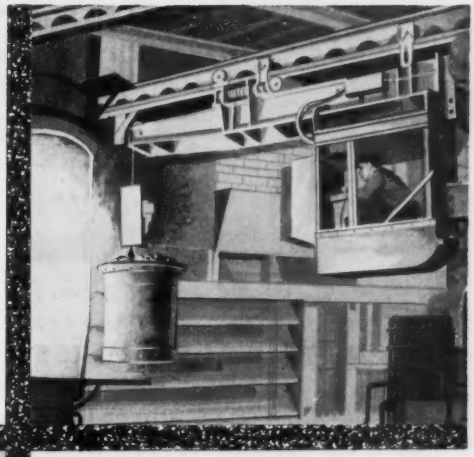

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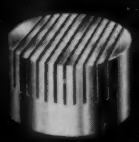
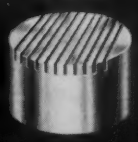
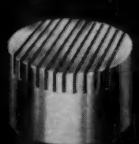


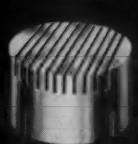
X-TRA DEEP HEAD .156 Wide Slots .014



SHALLOW HEAD .031 Wide or Narrow Slots .014 .010



DEEP HEAD .093 Wide or Narrow Slots .014 .010



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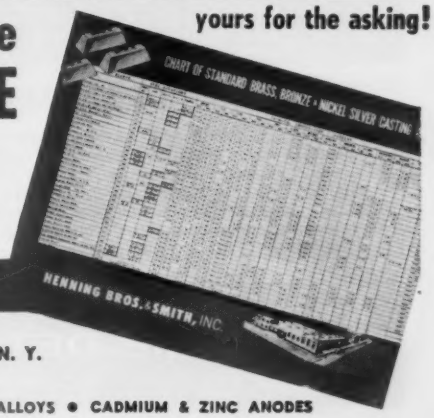

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ARE PREFERRED BY OPERATORS

because they are lighter in weight, better balanced and designed to reduce shock and be free from vibration.

IF YOUR PROBLEM INCLUDES

chipping, ramming, grinding, buffing, sanding or wire brushing, *write us today for full particulars.*

THE MASTER PNEUMATIC TOOL COMPANY, INC.

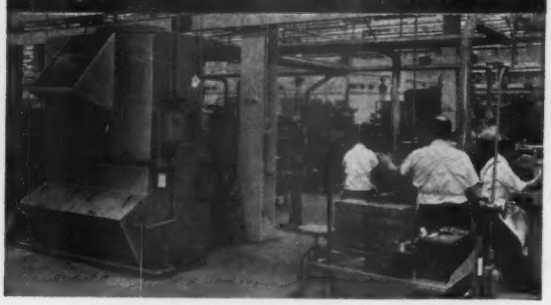
ORWELL, OHIO • U. S. A.

SALES • SERVICE • STOCK • COAST TO COAST

Circle 770 on Inquiry Card—Page 225

ND NEWCOMB-DETROIT EST. 1912

- INDUSTRIAL OVENS
- DUST COLLECTORS
- SPRAY BOOTHS
- PARTS WASHERS



UNI-WASH DUST COLLECTORS

Compact, complete recirculating Water-Type Dust Collectors for industrial processing dusts. Dirt is collected as wet sludge which may be carried away automatically. No moving parts. Extremely efficient for grinding operations. Eliminates danger of explosion from magnesium and aluminum dust. Proven in foundries. Standard Units available.

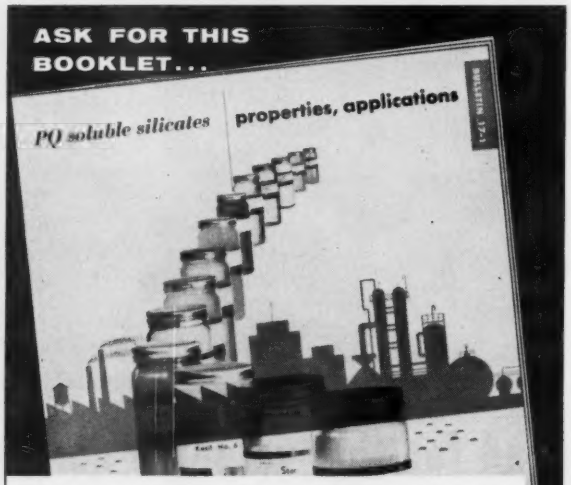
For Bulletins and Quotations, write to:

NEWCOMB-DETROIT

5755 RUSSELL ST. • DETROIT 11, MICH.

Circle 769 on Inquiry Card—Page 225

ASK FOR THIS BOOKLET...



Do you know about PQ's complete selection? Choose from over 40 silicates (liquid and powders) listed in the booklet. You'll find here the right sodium silicate for your process.

Deliveries of bulk or truckload and carload in drum quantities are made direct from our manufacturing Works located at Anderson, Ind.; Baltimore, Md.; Buffalo, N.Y.; Chester, Pa.; Jeffersonville, Ind.; Kansas City, Kansas; Rahway, N.J.; St. Louis, Mo.; Utica, Ill. Service for less than truckloads is available from distributors located in over 65 cities.

PHILADELPHIA QUARTZ COMPANY

1062 Public Ledger Bldg., Philadelphia 6, Pa.

PQ SOLUBLE SILICATES • METSO DETERGENTS

Circle 771 on Inquiry Card—Page 225

CLASSIFIED ADVERTISING

Help Wanted

FOUNDRY METALLURGIST

Exceptional opportunity exists for an experienced and creative foundry metallurgist to work on challenging research projects. This is an assignment where a man with real ability can advance in a rapidly expanding organization. Attractive salary and liberal benefits including tuition free graduate study and generous relocation allowance. Send resume to:

J. A. METZGER
ARMOUR RESEARCH FOUNDATION
of Illinois Institute of Technology
10 West 35th St.
Chicago 16, Illinois

PATTERN DRAFTSMEN

Experienced in the design of pattern equipment, core boxes, qualifying fixtures, and gages.

Excellent Salary
Permanent Position

Unlimited opportunities with a large, gray iron foundry in Northwestern Ohio.

Write stating qualifications to:

BOX 504, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

WANTED
SALES ENGINEERS

With experience in Heat Processing Equipment and Industrial Ovens. To represent a well established, respected, national organization with open exclusive territories in Philadelphia, Baltimore and Indianapolis.

Applicants should be familiar with these territories and manufacturers there. Replies confidential.

BOX 508, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

CASTING ENGINEER

For leading oil field equipment manufacturing firm in Houston, Texas. Prefer Mechanical Engineering Degree with foundry option but will consider Metallurgical or Industrial Engineer with adequate experience. Age to 35 with minimum of 5 years' experience in steel foundry operations dealing with casting design and pouring. Job entails liaison and coordination of all activities connected with setting up and operating a gray iron and steel foundry. Excellent promotional opportunity. Please furnish resume including salary requirement. Address: Box 485, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

FOUNDRYMAN

Real opportunity exists for responsible man with practical foundry experience, free to travel, demonstrating new foundry process. Liberal salary and expenses with excellent future. Address: CARVER FOUNDRY PRODUCTS, MUSCATINE, IOWA.

FOUNDRY ENGINEERS

Several engineers wanted. Must be thoroughly acquainted with cost work and work measurement standards based on time study. Free to travel. Address: Box 590, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

Help Wanted

YOUNG FOUNDRY METALLURGISTS

For control work in a large, gray iron foundry in Northwestern Ohio.

Outstanding Opportunity

Excellent Salary

Permanent Position

BOX 505, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

NONFERROUS FOUNDRY SUPERINTENDENT

Required for mechanized foundry manufacturing brass valves, pipe fittings, plumbing supplies, etc. Graduate metallurgist preferred, with some experience on Detroit Electric Furnaces and knowledge of synthetic sand technique an advantage. Will have charge of all foundry operations including metal analysis, furnace room alloying, melting and patternshop. Must be capable of setting up test laboratory and organizing metal control methods. Age under 50. Salary open. Apply to Personnel Department.

EMCO LIMITED
LONDON, ONTARIO, CANADA

PATTERN SUPERVISOR

For key job with modern production foundry. Must be journeyman wood patternmaker, able to take charge of wood, metal, and foundry setup. Experience in automotive foundry work preferred. Must have knowledge of gating, core blowing, rigging, etc. Age 30 to 50. Exceptional opportunity for right man. Apply giving particulars, including age, experience, references, how soon available and salary expected.

BOX 482, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

METALLURGIST

Magnesium or aluminum experience in sand castings desirable. Principally production problems consisting of improving procedure on established jobs and rigging of new work. Some development and research.

WELLMAN BRONZE & ALUMINUM CO.
2525 East 93rd Street
CLEVELAND 4, OHIO

FOREMAN—NONFERROUS

To take charge of a modern foundry producing ornamental, architectural and tablet castings in bronze and aluminum. Able to work along with and direct molders. Good opportunity for right party. State age, experience and salary desired in confidence. Address: Box 427 FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

SALES SERVICE ENGINEER

Wanted by progressive producer of foundry supplies. This is a real opportunity for young foundry engineer with experience in sand and/or melting practices. College education is desirable. Ability to learn and develop is essential. Send complete record. Address: Box 472, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

FOUNDRY FOREMAN

To take complete charge of a small captive foundry in the Pacific Northwest making stove and other light gray iron castings. Must have thorough background in cupola operation, sand control, rigging for production. In replying include complete resume of experience, availability, salary requirements and personal description. Address: Box 503, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

Help Wanted

MANAGEMENT CONSULTANT

Nationally known management consulting firm has several permanent opportunities for college-trained manufacturing and engineering executives, 28 to 36 years of age. These positions are with the Cleveland, Ohio, office of an expanding and progressive firm, and offer an unequaled opportunity to the man with at least 5 years of experience in Mining, Foundry, or Steel Engineering or Manufacturing. Degree and experience may be in either Industrial, Mining or Mechanical Engineering. Salary open. Replies will be held in strictest confidence. Please write giving full details to:

BOX 489, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

SALES ENGINEER

Experienced sales-service engineer is needed by midwest manufacturer of core blowers and other core room equipment, to work with sales agents, calling on foundries on sales and application of machinery. Send resume of education, experience and salary requirements. Replies held in confidence.

BOX 495, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

METALLURGICAL ENGINEER

Excellent opportunity for young metallurgist in medium-size midwest jobbing foundry. In addition to increasing efficiency and control of standard foundry operations, position would offer opportunity for practical research and development of new foundry processes.

BOX 455, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

DESIGNERS-DRAFTSMEN-ENGINEERS

Experienced in foundry layouts and equipment. Send experience record, personal data, recent photo and reference prior to personal interview.

BOX 450, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

STEEL FOUNDRY METALLURGIST

Leading steel foundry located in the Middle West with 500 ton capacity, has opening for a qualified metallurgist.
Must be a technical man of proven ability, and able to direct Metallurgical Department.
Submit data covering experience, education, age, references and salary range, etc. All replies confidential.

BOX 442, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

METALLURGIST WANTED

Capable of taking complete charge of Laboratory, supervising melting furnaces in steel foundry producing carbon, low alloy and stainless castings. Should have knowledge of X-Ray and Magnaflux procedures. Excellent opportunity. Write, giving complete resume and salary expected. Address: Box 480, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

LAYOUT MAN

For metal pattern shop. Paid vacations and holidays. Steady employment. PROCESS PATTERN & ENGINEERING CO., INC., 1707 N. HARRISON ST., FORT WAYNE, INDIANA.

CLASSIFIED ADVERTISING

Help Wanted

FOUNDRY SUPERINTENDENT

Small jobbing foundry in Western Canada requires Superintendent with knowledge of all phases of iron foundry production including Ductile Iron. Please send qualifications, references, late picture and salary requirements. Address: Box 488, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

GRAY IRON FOREMAN

Excellent opportunity for right man in a progressive, medium-sized, mechanized foundry located in New England. Send complete resume including experience, age, salary desired, references, etc. Address: Box 481, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

MALLEABLE FOUNDRY EXECUTIVE

Malleable foundry, 400 employees, interested in man with knowledge of all phases of foundry operations for position as superintendent. Write stating full qualifications, experience, references and salary desired. All replies held confidential. Address: Box 470, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

MATCH PLATE MANAGER

Need aggressive man who can take full charge of operations. Sales now limited, have high potential. Good salary and share in profits. Location: Milwaukee Area. Address: Box 484, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

SUPERINTENDENT

For nonferrous foundry. Excellent opportunity for man with good educational background and sound practical experience. Address: Box 479 FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

PERMANENT MOLD DESIGN ENGINEER

Must be capable of heading up department as well as designing molds. Address: HAMPDEN BRASS & ALUMINUM CO., 262 LIBERTY ST., SPRINGFIELD 1, MASS.

GRAY IRON FOREMAN

Gray iron jobbing foundry near Cleveland needs a dry sand foreman for medium and large floor work. In reply give age, experience, references and include photograph. Address: Box 454, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

Positions Wanted

FOUNDRY SUPERINTENDENT

Thirty-three years' practical experience, ferrous and nonferrous, jobbing and production, fully qualified to take complete charge of all foundry operations, mix metals by analysis, iron, semi-steel, ductile iron, brass, bronze, copper, aluminum in green sand, dry sand, semi-shell and shell molding. A-1 in plaster molds and cores. Capable to handle pattern shop. Address: Box 507, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

SUPERINTENDENT

Practical, technical background. Light and heavy, green and dry sand. Cupola operation, cost conscious, jobbing and captive. Last place 18 years, foundry superintendent, technical foundry advisor, liaison man between machine, pattern shop and casting buyer. Address: Box 499, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

FOUNDRY MANAGER GENERAL SUPERINTENDENT

Foundryman, late thirties, extensive background in good foundries, from metallurgy and foundry engineering through superintendency and management. Seek management position with progressive steel or gray iron organization, preferably one requiring technical improvement or rejuvenation. Presently employed in executive capacity with large company, but wish position of great responsibility. Address: Box 496, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

SUPERINTENDENT OR MANAGER

Progressive foundryman familiar with every phase of practical experience on all classes of work. Now employed. Would like to make change. Address: Box 490, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

Employment Service

FOUNDRY PERSONNEL SPECIALISTS

National Placement and Procurement of

GENERAL AND PLANT MANAGERS, PLANT SUPERINTENDENTS, FOREMEN—ALL DEPARTMENTS, METALLURGISTS, ENGINEERS, CONTROLLERS, ACCOUNTANTS, SALESMEN, SALES MANAGERS, PERSONNEL DIRECTORS, PURCHASING AGENTS

Confidential Inquiries Invited
From Employers and Qualified Applicants.
For Fast Competent Assistance Contact

DRAKE PERSONNEL, INC. **HARRISON 7-8600**
JOHN COPE, DIRECTOR **220 SOUTH STATE ST., CHICAGO, ILL.**

SALARIED PERSONNEL

$5000-$30,000. This reliable service established 1927, conducts confidential negotiations for high grade men who seek a change of connection under conditions assuring if employed full protection to present position. Send name and address only for details. Personal consultation invited. Address: JIRA THAYER JENNINGS, P.O. BOX 674, MANCHESTER, VERMONT.

Positions Wanted

FOUNDRY MANAGER AND METALLURGIST

Presently managing gray iron foundry seeking new affiliation with progressive gray iron or malleable foundry or sales organization. Experience in management, technical, sales and operational phases of gray iron and malleable. Age 35. Address: Box 476, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT

Thorough knowledge of all phases of nonferrous metals. Understand gating, jobbing, floor, machine and plumbers supplies. Can also produce pressure tight and porous free castings. Know sand control and core room work. Address: Box 448, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

FOUNDRY MANAGER-SUPERINTENDENT

B.S. in Metallurgical Engineering. Experience in cupola and electric arc practice of plain and alloy cast irons, low carbon, low and high alloy steels. Knowledge of sands, pattern shop and heading and gating. Cost minded and enjoy excellent labor relations. Address: Box 492, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

BUSINESS ADMINISTRATOR

Three years nonferrous metal sales and ferrous foundry supply. Insurance broker and registered representative, New York Stock Exchange. BA Degree. Completing Master's in Marketing. 30 years young. Chicago only. Address: Box 486, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

FOUNDRYMAN

Gray iron or nonferrous. Familiar with every phase of the foundry, background of practical and technical experience. Now employed as superintendent. Address: Box 498, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

PATTERNSHOP SUPERINTENDENT

Middle 30's, married. Experienced in patternshop supervision, knowledge all phases of pattern work and production foundry practices. Desire to relocate, small community preferred. Address: Box 478, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

MANAGER

Practical and technical trained foundryman. Age 45. Well versed in every department of ferrous jobbing shops, on castings up to 30 tons. Excellent labor relations. Cost and quality minded. Now employed. Address: Box 466, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

MANAGER—SUPERINTENDENT

Age 42, college. Capable of complete charge. Thoroughly familiar with all phases of ferrous and nonferrous sand casting to five tons. Now operating 1,000 ton per month shop. Desire change. Address: Box 501, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

FOUNDRYMAN

Dynamic, progressive, mature, permanent mold aluminum foundry operator now available. Can handle sales quotations, mold design, mold manufacturing, casting production. Address: Box 500, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

CLEANING ROOM FOREMAN

Experienced in all phases of this work. Address: Box 477, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

Representatives Wanted

SALES REPRESENTATIVES

Leading manufacturer of core blowers and allied foundry equipment seeks manufacturer's agents, now calling on foundries in Indiana, Michigan, Wisconsin, New York and New England territories. Resume should include education, experience, lines handled, area covered. Replies strictly confidential. Protected territories.

BOX 494, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

SALES REPRESENTATIVES

Two well-established sales territories now open, for an internationally-known, foundry equipment manufacturer. Applicants must have had actual foundry experience, be ambitious and aggressive, be willing to travel and relocate, if necessary. All replies strictly confidential.

BOX 502, FOUNDRY
PENTON BLDG., CLEVELAND 13, OHIO.

SALES REPRESENTATIVE

Manufacturer's agent to sell wood and metal patterns for an established pattern shop. Chicago, Michigan, Iowa, areas. Excellent opportunity for right man with pattern and foundry sales experience. Strictly commission but liberal if results good. Send complete resume.

BOX 487, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

MANUFACTURERS' AGENTS WANTED

To handle well-established repeat supply item sold to pressure die casters. Leader in its field. Splendid earnings opportunity with a product that is a "household name" in the die casting industry. Give full details concerning lines handled. We are especially interested in frequency of contact you now have with pressure die casters. Address: Box 459, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

SALES REPRESENTATIVES

Large nonferrous sand and permanent mold foundry interested in commission salesmen in Illinois, Indiana, Missouri and Michigan. Replies confidentially treated. Personal interviews upon request. Write resume of experience. Address: Box 439, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

SALESMEN

Calling on foundries to carry two nationally advertised lines. Items used in core blowing. Repeaters. Commission, state territory. Address: Box 493, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

FOUNDRY SUPPLY SALESMAN

Established manufacturer of facings and foundry supplies requires experienced foundryman for Northwestern Ohio territory. Address: Box 483, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

Representatives Wanted

REPRESENTATIVES WANTED

We are changing our sales policy and are interested in discussing the sales of our melting furnace equipment with representatives in various districts outside of New York and Chicago. We manufacture a complete line of gas and oil non-ferrous melting furnaces in all sizes and types.

Also interested in a salesman for our home office.

STROMAN FURNACE AND ENGINEERING COMPANY
9900 FRANKLIN AVENUE
FRANKLIN PARK, ILLINOIS

MANUFACTURERS' AGENTS WANTED

Established steel foundry producing carbon and low alloy steel in jobbing and production lots is interested in representation in several territories between Chicago and the East Coast. Casting experience preferable. Submit details and other lines now carried. Address: Box 497, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

SALESMEN

Established gray iron foundry is expanding sales force. Seeks men between ages 28 and 40 with some gray iron sales experience. Will operate out of Cleveland. Should have car. Send resume. Interviews will be arranged. Address: Box 506, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

Representative Available

REPRESENTATION AVAILABLE

Steadily growing aggressive sales outlet desires additional lines. State of Wisconsin, Northern Illinois. Interested in heavy equipment, flasks etc. as well as supplies. Address: Box 475, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

Opportunity

PERMANENT MOLD METHOD AVAILABLE THE WAGNER PERMANENT MOLD CO., 2910 Empire Ave., Burbank, California, has developed a Permanent Mold Method for ferrous and nonferrous metals and invites inquiries from any country regarding this method and process.

C. W. AMMEN
8651 GREENLEAF AVE.,
BUENA PARK, CALIF.

Invites inquiries from anyone U.S. or foreign as to his specially developed tapespondence consulting service in all phases of the nonferrous foundry operations.

ACTIVE PARTNER WANTED

For 90 year old Georgia foundry. Shop partially burned out. Foundry intact. Four acre property and R.R. siding. Capital needed up to $50,000. Address: KELVIN ENGINEERING CO., 92 PINE ST., NEW YORK CITY, WH-4-9149.

Foundries For Sale

FOUNDRY AND MACHINE SHOP

At Grand Junction, Colorado in the heart of the Uranium industry. Only foundry between Denver and Salt Lake City. Will lease real estate if desired. Address: HAYDEN TWIST DRILL CO., MANILA, ARKANSAS.

Open Capacity

OPEN CAPACITY

We have open capacity on Squeezer, Cope and Drag, and Crane Molding. We also have open capacity in our machine shop on Radial and Multiple Spindle Drill Presses. Address: THE TREATY COMPANY, GREENVILLE, OHIO, PHONE: LIncoln 8-2185.

Wanted-To-Buy

Wanted-To-Buy

CONSUMERS CONVERTERS SUPPLIERS

ALLOYS: NICKEL—COBALT—CHROME—TUNGSTEN—MOLY.

We Purchase: Alloy Slags, Skimmings, Drosses, Residues.

Offgrade and Surplus Alloy Materials

ALLOY DIVISION
United Refining & Smelting Co.
2920 W. Carroll Avenue
Chicago 12, Illinois
Phone: Sacramento 2-3300

WANTED TO BUY

Complete small mechanized brass foundry equipment.

NATIONAL POOL EQUIPMENT COMPANY
LEE HIGHWAY
FLORENCE, ALABAMA

WANTED

Osborn #720PJ Jolt Squeezer Strip
or #721PJ Jolt Squeezer Strip.

BOX 473, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

WANTED

Melting furnaces, tilting type, gas and oil fired; Mullers: Simpson, Beardsley & Piper, Clearfield, all sizes. Prompt reply appreciated. Address: Box 467, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

WANTED

By small foundry B & P 3½ portable Mulbaro. State age, condition and price. Address: FLORIDA FOUNDRY AND PATTERN WORKS, 3737 NORTHWEST 43rd STREET, MIAMI, FLORIDA.

MIXERS WANTED

Used Simpson Intensive Sand Mixers. State size, condition and lowest cash price or immediate acceptance. Address: Box 578, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

For Sale

FOR SALE
TURBO BLOWERS WITH MOTORS

CFM	PRESS.	MAKE	CFM	PRESS.	MAKE
8375	20oz.	Spencer	340	20oz.	A-B
6000	32oz.	Ing.-Rand	320	12oz.	Spencer
4700	32oz.	Ing.-Rand	9000	6"SP	Northern
2500	7oz.	Sturt.	3420	8"SP	N.Y.
1300	16oz.	Spencer	2700	⅝"SP	Ilg
800	13oz.	Buffalo	2500	½"SP	American
400	12oz.	Buffalo	1100	4½"SP	Bayley
450	7oz.	Spencer	2344	2"SP	Clarage
400	16oz.	No.Am.			

THE MOTOR REPAIR & MFG. CO.
1552 HAMILTON AVE.
CLEVELAND 14, OHIO

For Sale

GUARANTEED
MACHINES
AT LOWEST PRICES

JOLT SQUEEZE
STRIP MOLDING MACHINES

213 SPO; 4½" jolt; 13" squeeze
2114 SPO—11" sq.
2136 SPO—13" sq.
720 U Osborn—11" sq.
International PKL—14 x 5½

JOLT ROLLOVER
MOLDING MACHINES

Tabor—30" x 40"; 12" draw; shockless—1000# cap.
2047 Osborn; 18" x 24"; stationary
601 Osborn; 30" flask
602 Osborn; 36" flask
605 Osborn; 54" flask

JOLT SQUEEZERS

MILWAUKEE MODEL 103 10" SQ. 16 x 20; 4½" JOLT DIA. $125.00 EACH
275 J Osborn; 16 x 20; 10" sq. cyl.
113 J SPO; 17 x 26; 13" sq. cyl.

CORE BLOWERS

Redford Core Blowers
#193 Osborn for medium cores
#94 Osborn—for large cores

MATERIAL HANDLING EQUIPMENT

Model HA Hough Payloader
Clark Fork Lift Truck—6000 lb. Gasoline
Clark Fork Lift Truck—5000 lb. Electric—with battery
Elwell Parker Fork Lift Truck—4000 lb. Gasoline
Mercury Fork Lift Truck—2000 lb. Electric
Lewis-Shepard Platform Lift Trucks

FURNACES

2000 lb. Stroman—Tilting Hydraulic
2000 lb. Fisher—Aluminum
350 lb. Detroit Rocker Barrel—Complete

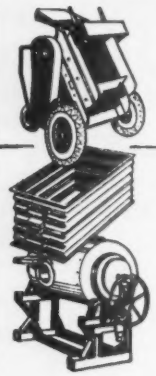
CORE OVENS

Dielectric—Model 900A and 1800A. Set up in your shop in operating condition. Less than one-half price.

MISCELLANEOUS
FOUNDRY EQUIPMENT

Roller conveyor, 3" channel iron; 2½" rolls; 6" on center; ⅛" above rail, 3000 ft.
U.S. 7½ HP 3 speed grinders; 28" wheel
Model S Screenerator—B & P
Climax Wire Straightener
Model AA American Sandcutter
Jib Cranes—2 ton capacity
Electric Hoists—2 ton capacity
#42 Osborn Hand Rollovers

REPAIRS ON ALL MAKES OF AIR TOOLS.
For the Best Deal Call
BALCHER MACHINERY COMPANY
695 E. 152nd STREET CLEVELAND 10, OHIO
TELEPHONE: GLENVILLE 1-2474



EUCLID FOUNDRY & MACHINE EQUIPMENT CO.

14919 SARANAC ROAD — CLEVELAND 10, OHIO

CUPOLAS:

2—#9 Whiting with swivel type charger and 75 H.P. blower

1—#7 Whiting with 1 Yd. skip bucket and charging hoist

1—#5 Whiting with cupola charger, blower and Foxboro controls

1—#2 Whiting with cupola charger, blower and Foxboro controls

1—#3½ Modern with blower

OSBORN ROLLOVERS:

5—405 rollovers and pattern draw 18 to 26" draw, air clamps, 3500 lbs. capacity.

ASK FOR OUR COMPLETE LISTING!!

GUARANTEED USED FOUNDRY EQUIPMENT

GLENVILLE 1-1222

Circle 861 on Inquiry Card—Page 225

FOR SALE

1—MC-5 Shalco Shell Core Blower
1—B & P CB-5-CD core blower with universal blow plate and 4" draw. Used only 30 days
1—8A Vibratory sand feeder for #1 Demmler—never used
1—Buckeye 5-Drawer portable core oven
1—Loader only for 27 x 36 Wheelabrator
1—5 HP Lippmann double end Stand Grinder
1—3 HP Queen City double end back Stand Grinder
1—4 HP #3 Gardner Double end Stand Grinder (Above Grinders 1800 RPM, 60 cy., 220 volts)
1—Torrit 1.5 HP dust collector
10—12" x 1½ x 1½ Carborundum grinding wheels for brass or iron. WC30-P4 VD. Never used.

PONTIAC FOUNDRY, INC.
2509 E. PONTIAC ST. FORT WAYNE, INDIANA
PHONE: HARRISON 3132

REPAIR AND REBUILDING SERVICE ON ALL PNEUMATIC TOOLS

We try to keep on hand a stock of **"Hard Chrome Rebuilt Foundry Tools"** such as Rammers, Chipping Hammers and Core Breakers.

Our prices are about **One-Half** the cost of new tools. All tools sold by us are guaranteed and can be returned if not found satisfactory.

CENTRAL PNEUMATIC SERVICE COMPANY
512 LINDEN AVENUE
DAYTON 3, OHIO

FOR SALE

1—Simpson Mixer, #2, 20 HP motor.
Miscellaneous: Screens, Pulverizers, Grinders. Tyler Rotap Screens etc.
Wanted: Your Idle Machinery.

OUR 40th YEAR

CONSOLIDATED PRODUCTS CO., INC.
66 BLOOMFIELD STREET
HOBOKEN, NEW JERSEY
OL 9-4425 N. Y. TEL. BA. 7-0600

EQUIPMENT FOR SALE
SHELL MOLDING MACHINE

Late model Shell Process Automatic Molding Machine—Pattern Size 20" x 30", gas fired, 220-60-3, excellent condition, operating now.

J. T. MOORE
WELLS MANUFACTURING COMPANY
SKOKIE, ILLINOIS

OIL FIRED MONOMETER ROTATING FURNACE

½ to 1 ton aluminum capacity smelting and refining furnace suitable for solids and turnings, complete with reversible rotating gear and magnetic brake and ingot molds. In excellent condition, four years intermittent use. May be viewed at Ajax, photographs on application.

CAMETOID LIMITED
AJAX, ONTARIO, CANADA
PHONE Ajax 106 or
Toronto EM 4-4947

FOR SALE

Wheelabrator "Tumblast" 42 x 48 in good condition. 1947 model but recently overhauled. $3500.00

CHAPIN CYLINDER HEAD COMPANY
CHAPIN, ILLINOIS

FOR SALE

Lectromelt 250 lb. type "U" side charge electric furnace. Complete, good condition.

BEAVER VALLEY ALLOY FOUNDRY CO.
MONACA, PENNSYLVANIA

FOR SALE

Manufacturer of steam, drainage and soil fittings for over 40 years has suspended operations. Modern pattern equipment offered for sale.

BOX 491, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

FURNACES FOR SALE

Ten used heat treating furnaces and two 7-ton gantry cranes. Good condition, priced to sell. Address: BAER STEEL PRODUCTS, INC., BOX 1428, BOISE, IDAHO.

FOR SALE

JOHNSTON & JENNINGS 1020 B Jolt Rollover with hydraulic head, excellent condition.

Ingersoll-Rand Air Hoists, one and 2 ton never used. Still in original crates.

1—Nichols Plain Molding Machine, High Speed.
3—U.S. Variable speed Grinders. Double end, 7½ H.P.
1—Standard Variable speed Grinder, Double end, 7½ H.P.
1—Barrett Cupola, 20" x 10' with air operated skip hoist.
2—Whiting Hydro-Blast Barrels with pumps.
1—Skip Hoist for 36 x 42 Tumblast Machine.
1—Davenport #28 SA Jolt Rollover, Pattern draw.
1—27 x 40 Table with Air Clamps.
2—International Rollovers, Portable.
6—Arcade Model 1008 Jolt Squeezers, Stationary.
2—Champion Model JS 10-S Jolt Squeezers, Stationary.
1—International Plain Jolt 36 x 48.
1—International Core Blower SB 13.
3—Milwaukee Squeezers, Stationary.
2—International Squeezers, Portable.
1—Whiting Tumbling Barrel 36 x 72 motorized.
1—Demmler #1 Core Blower.
1—Demmler #2 Core Blower
1—International SB 11 Core Blower.
1—Ready Sand Unit.
2—Tabor rollover, power, 30 x 40, 12" draw.
3—Snag Grinders AC & DC.
3—Pouring Ladles, geared, 2000 lb. Cap.
Cupola Blowers, all sizes.
Aluminum Core Plates, 16 x 22, 16 x 20, 18 x 24.
Steel Flasks 13 x 22 to 26 x 31.

Wilson Hardness Testers.
Steel Corrugated collapsible stacking boxes. 35 x 50 x 25 deep.
Magnesium and steel Buckets for elevators
Belting, all sizes.
Air Hammers, Grinders and Chippers.

MANY OTHER ITEMS IN STOCK
SEND US YOUR INQUIRIES

WE BUY — SELL — TRADE

HOMAN MACHINERY COMPANY
710 E. FRONT ST.
CINCINNATI, OHIO
MAin 1-0339

FOR SALE

2—HUTCHINSON SHELL MOLDERS—Model 1424—slightly used, in excellent condition.
3—REDA FURNACES—Model 1000, one never used, two slightly used, in excellent condition.

McBRIDE & SHOFF, INC.
METAMORA, ILLINOIS

ACME IS NOW LIQUIDATING

MODERN, MECHANIZED GRAY IRON FOUNDRY

Formerly Property of SPENCER FOUNDRY DIVISION, Park and First Streets

WILLIAMSPORT, PENNSYLVANIA

ONE OF THE EAST'S LARGER PRODUCTION FOUNDRIES.

OVER 200,000 SQUARE FEET FILLED WITH GOOD FOUNDRY EQUIPMENT

Everything must be sold and equipment moved as quickly as possible!

The following is a partial list of the thousands of items offered for sale.

1—Whiting #10 Cupola; 2—Whiting #9 Cupolas; 2—14000 C.F.M. 40 oz. Cupola Blowers; 3—Simpson #3 Mullers; 1—B. & P. #70 Muller; 1—B. & P. #60 Muller; 3—Mold Conveyors, 1 with 48" x 84" cars; 3—Synchronous Air Compressors up to 300 H.P.; 30—Molders hopper system; 28—Molding Machines, Nichols, Milwaukee, Osborn, Davenport; 1—B. & P. 27/40 H.P. Slinger; 1—B. & P. 19" Tractor Type Slinger; 2—Slinger Turntables 24'; 4—Shakeouts; 20—Air Hoists; 5—Core Grinders; 2—Fox Single Wheel Grinders; 10—Core Blowers; 4—Wheelabrators; 3—Tumbling Barrels; Laboratory Equipment; Complete Pattern Shop.

Ladles, 200 ton flasks, air tools, yard switching engine, monorails, trolleys, bridge cranes, core plates, chaplets, foundry supplies and alloys, thousands of feet of flat and troughing sand belt conveyors, thousands of feet roller conveyors, and other items too numerous to mention.

WRITE • WIRE • PHONE

ACME EQUIPMENT COMPANY, INC.

DIRECT ALL INQUIRIES TO LIQUIDATION OFFICE

Park & First Streets, Williamsport, Pennsylvania; Phone: 9161-9162 Williamsport

Main Office: 126 S. Clinton Street, Chicago 6, Illinois; Phone: ANdover 3-3430

Circle 862 on Inquiry Card—Page 225

FOR SALE

MOLDING MACHINES
1—Tabor 22" Power Jolt, Rollover, Draw, Portable, 22" x 32" Table.
1—Milwaukee jolt-squeeze stationary.
2—International Jolt, Rollover Draw, 24" x 10G, Stationary.
2—No. 275 Osborn jolt squeezers. Stationary
2—SPO Jolt Squeeze strip—13".
BLOWERS FOR CUPOLAS AND FURNACES
1—Connersville Rotary Blower, 6000 CFM.
1—Connersville Rotary Blower, 3500 CFM.
2—#7½ Roots Rotary Blowers—27 x 81—14000 CFM.
2—Connersville Rotary 14" x 27" HD, 2750 CFM at 5# press.
Maxon-Premix Blowers for Gas ¼ to 1 HP.
2—2 HP 20 oz. Spencer Turbine Blowers.
1—Spencer Turbine Blower, 2700 CFM, 27 oz., 30 HP, 3/60/220-440 V.
METAL MELTING EQUIPMENT
1—1000# open flame brass melting furnace, gas fired.
1—Hausfeld tilting crucible, gas fired, 500# brass.
1—Hausfeld Stationary Brass, oil or gas burner, 200# cap.
1—Hausfeld Tilting crucible, gas 250# Al, Cap.
1—Hausfeld 2000# aluminum capacity furnace barrel type, open flame, oil fired.
1—#2 U.S. rotary melting furnace, 500# brass.
MISCELLANEOUS
1—Hydro-Blast barrel with 25 HP pump.
3—Jib cranes, 16' swinging beam, 2000# cap.
1—Ready Sandy, Portable, Complete.
1—International SB-11 core blower.
2—Pangborn cloth screen collectors, 1½ HP.
1—Stoney crane type shakeout.
1—Combs Riddle.
1—NDP Royer sand separator.
1—#16 Roto-clone unit complete.
Complete stock of rebuilt mill and dust exhaust blowers.

CLIFTON MACHINERY COMPANY
1023 W. SIXTH ST. CINCINNATI 3, OHIO

FOR SALE

1—Beardsley & Piper Tractor Type Sandslinger with 16" Head. Complete with Magnetic Separator and Hydraulic Jack.

Price—$2,500.00

BACCELLIERI MFG. COMPANY
BERLIN, NEW JERSEY

URGENTLY NEEDED

Small Wheelabrators or Pangborn TumBlast, or Table Blast. Will pay cash or will give tremendous trade in value on any of the Sand Blast Equipment listed below:
Pangborn E.S. 347 Conveyor Cabinet, 4 throwing wheels, used for blasting motor blocks, a beauty, can be seen in operation.
Pangborn 14 GK" Rocker Barrel
48 x 48 Wheelbrator TumBlast
42 x 48 Wheelabrator TumBlast
36 x 42 Wheelabrator TumBlast
27 x 36 Wheelabrator TumBlast Rubber or Steel Belt
15" Continuous Wheelabrator TumBlast
8' Wheelabrator Table Blast
6' Wheelabrator Table Blast
Vapor Blast Cabinets, singles and doubles
All types and sizes of Hand Cabinets, Dust Collectors, Pressure tanks, Rooms, Horizontal or Vertical Tumbling Barrels and additional Sand Blast Equipment too numerous to mention.

DIAMOND SALES, INC.
5654 W. JEFFERSON DETROIT 9, MICH.
VI 36750

WE WILL BUY ONE PIECE OR YOUR ENTIRE PLANT.

FOR SALE

SHALCO SHELL MOLDING MACHINE
Model HO-4

Used machine in excellent condition. Complete with standard heater plates and cycle timer.

D. C. HARTMAN
COVE PATTERN WORKS, INC.
2401 W. SUPERIOR CLEVELAND 13, OHIO

FOR SALE

MOTORS—GENERATORS
TRANSFORMERS

Unused — Rebuilt

WORLD'S LARGEST INVENTORY

ELECTRIC EQUIPMENT COMPANY
Phone Station Collect GLenwood 3-6783
P.O. Box 51—Rochester 1, New York

FOR SALE

Royer NC 2 Sand Separator and Blender, 10 to 15 tons per hour, rubber tired. Climax #2 core wire straightener, Milwaukee 3036D Plain Jolt Table. Many other items. Send for our bulletin #39.

SOMIL EQUIPMENT & SUPPLY COMPANY
SOUTH MILWAUKEE, WISCONSIN
PHONE SO 2-3880

FOR SALE

Four Osborn Model 2047-3 Rollover jolt molding machines, serial #10867-BN. Core box 21¼ x 22¼, flask space 11⅛", pattern draw 8". Never used.

TRIPLEX MACHINE TOOL CORP.
75 WEST STREET
NEW YORK 6, NEW YORK

FOR SALE

Stroman manual tilt crucible melting furnace, Type OH crucible—size #175—capacity 500# gas fired—16 ounce—220-440 volts blower. Complete—Like New

UNITED REFINING & SMELTING CO.
2920 W. CARROLL AVE.
CHICAGO 12, ILLINOIS
PHONE: SACRAMENTO 2-3300

FOR SALE

14 Osborn 275 PJ Jolt Squeezers, excellent condition, recently taken from service. $175.00 each. Address: Box 468 FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

MOLDING MACHINE

Herman 6000# capacity, jolt-roll-draw in operating condition. Asking $2900 f.o.b. Address: POTTSTOWN MACHINE CO., POTTSTOWN, PA. (Phone 37, H. H. Houston).

AAA MACHINERY & EQUIPMENT CO.

over 1000 satisfied customers

WORLD'S LARGEST INVENTORY OF GUARANTEED FOUNDRY EQUIPMENT

AIR COMPRESSORS

1—CHICAGO PNEU., 160 CFM, 30 HP.
1—SULLIVAN WG-8, 152 CFM, 20 HP.
1—CHICAGO PNEU., Size 7½ x 6, 20 HP.
2—GARDNER, Model ADR, 15 HP.
1—SULLIVAN WN-3, 1220 CFM, 250 HP.

AIR & ELECTRIC HOISTS

85—INGERSOLL RAND Air Hoists, Sizes 4C-5, A, B, C, D, & D6. ¼, ½, 1, 2, & 3 ton cap.
15—DETROIT Air Hoists, 1 & 1½ ton cap.
15—APPLETON Air Hose Reels.
2—P&H and DETROIT Model LHR, 5 ton Electrics.

BUCKET ELEVATORS

2—LINK BELT 35 ft. & 50 ft., 12" x 7" Buckets.
2—NATIONAL 45' & 50', 10" x 7" & 14" x 7" Buckets.

CUT-OFF MACHINES

1—DeWALT ME2, 10 HP, 24" Blade.
1—GROB Band Saw, Type OS-36.
3—TESSEMER H & I Sprue Cutters.

CORE BLOWERS

3—CHAMPION Model CB-10, CB-18, & CB-400. From 10 to 300 lb. Cores.
22—DEMMLERS Model Nos. 1, 1E, 2, 2E, 2K, 3, 3E, 3K, 4, & 4E. From 10 to 100 lb. Cores.
7—INTERNATIONAL Model SB-11 & SB-13, SB-15H, 15 to 30 lb. Cores.
6—OSBORN Nos. 192, & 193. From 10 lb. to 75 lb. Cores.
8—REDFORD & MILWAUKEE Bench Type.

CORE OVENS

4—CARL MAYER 2-Compartment, gas fired, I.D. 7' W x 14' deep x 8' H each.
1—INDUSTRIAL "Revolving Carriers" continuous, 18" x 80" trays.
1—MAEHLER Single Compartment I.D. 96" L x 80" W x 84" H, gas fired.
2—PORBECK Model C-3-C, Double Drawer Type. Gas fired, new in 1955.

CUPOLA BLOWERS & EQUIP.

1—SPENCER 150 HP 7500 CFM 48 oz.
2—INGERSOLL RAND FS-367, 8,150 & 9,400 CFM, 50 & 100 HP motors.
1—ROOTS 7,000 CFM, 50 HP motor.
14—LINDBERGS. From 1 HP to 15 HP, 160 to 2100 CFM.

ROTO-CLONES WET TYPE

9—AMERICAN AIR FILTER Type N&W, Sizes No. 10, 14, 20, 24, 27, & No. 30. All arranged with sludge ejectors. Capacities up to 30,000 CFM.

ELECTRIC MELTING FURNACES

4—DETROIT Rockers Type AA, 750 to 1500 lbs. capacity with 200 or 350 KVA Transformers.
1—AJAX 20 KW Induction Unit.
1—TOCCO 20 KW Induction Unit.
3—AJAX No. 300 & 500 Furnaces Only.

GAS & OIL FIRED FURNACES

23—LINDBERG FISHER Model MN P Electric Tilting, Sizes 150, 300, 400, 600, 1700, 2000, & 2400. Aluminum capacities 150 to 2400 lbs. Gas or Oil Fired, With Motors & Blowers.
5—LINDBERG FISHER Type BBI Hand Tilting Furnaces, Sizes 100, 125, 225, & 1000, With Gas or Oil Fired, With Motors & Blowers.
29—LINDBERG FISHER & CAMPBELL HAUSFELD Stationary, Sizes 100, 150, 200, & 550, from 100 to 550 lbs. capacity. Gas or Oil Fired, with motor & blowers.

GRINDERS

Swing Frame

1—MARSCHKE 12" x 2" wheel, 3 HP.
1—MARSCHKE 20" x 10" wheel, 10 HP.
2—FOX No. 6, 24" x 10", 15 HP.
3—MARSCHKE 24" x 3" wheel, 15 HP.

Snagging

2—U.S. #64, 20" x 3" wheel 7½ HP.
2—SAFETY #174, 24" x 3" wheel 10 HP.
2—MARSCHKE 24" x 4" wheel, 20 HP.

Disc

1—BEASLEY #372 Vertical Spindle Dry Grinder, 53" dia., 20 HP, new 1952.
1—QUEEN CITY Model 100 20" x 2" wheel.
1—U.S. #80, 16" x 3" wheel, 7½ HP.

Core

2—MILWAUKEE 70-12, 70" dia. table.
1—STONEY Core Grinder, 16" dia. Wheel.

LADLES

17—MODERN & WHITING Cylindrical Ladles, 275, 1500, 2450, & 3000 lbs. capacity. All Enclosed Gears, Some Mounted on Stands.
12—MODERN Model F-9 and FA-9 Pouring Devices, with ladles 400 to 800 lbs capacity.
37—MODERN & WHITING Lip Pour, Enclosed Gear, 1200, 1600, 2000, 4000, 6000, 7000, 8000, 20,000, 40,000, & 80,000 lbs. capacity ratings.
7—MODERN & WHITING Cylindrical Mixing Ladles. 2 & 3 ton capacities. Electric & Manual Tilting.
7—WHITING Bottom Pour 4 ton.

MOLDING MACHINES

Jolt Squeezers

37—OSBORN, SPO, MILWAUKEE & TABOR, Portable & Stationary. 10" Squeeze Cylinder.
13—OSBORN, MILWAUKEE & SPO Portable & Stationary, 12" Cylinder.
6—MILWAUKEE 18" Cylinder, 24" x 36" Table.

Jolt Rollover Pattern Draw

1—DAVENPORT 28-SA, 29" x 40" table.
2—DAVENPORT 40-SA, 42" x 50" table.
1—HERMAN 6000 lb. Series, 42" x 78".
3—HERMAN 1500 lb. Series, 26" x 48".
1—HERMAN 750 lb. Series, 20" x 30".
2—HERMAN 4000 lb. Series, 40" x 60".
14—INTERNATIONAL Type G, Table Sizes 20" x 8", 24" x 10", 30" x 12".
1—INTERNATIONAL RES Size 15" x 8".
2—J & J #612, 24" x 30" Table.
4—J & J #918, 44" x 54" Table.
1—J & J #815-B, 30" x 40" Table.
1—MILWAUKEE #167, 32" x 33" Table.
1—MILWAUKEE #217, 35" x 41" Table.
1—MILWAUKEE #60B-3, 60" Flask.
10—OSBORN #40 and 42 Core Rollovers.
1—OSBORN #442, 21" x 31" Table.
2—OSBORN #242W, 29" x 42" Table.
12—OSBORN #601 & 602, 30" & 36" Wide Flask, 10" Draw, 750 lbs. Cap.
1—SPO #413D, 24" x 25" Table. 10" Draw.
1—SPO #506, Portable, 24" x 30" Table.
3—TABOR 30" x 40" Table, 12" Draw.
4—TABOR 22" x 32" Table, 10" Draw.

Jolt Pin Lift

2—DAVENPORT 24-AJS, 24" x 30" Table.
2—OSBORN #559, 25" x 30" Table.
1—OSBORN #560, 32" x 45" Table.
1—OSBORN #563, 55" x 63" Table.
2—MILWAUKEE #2542, 38" x 42" Table.
1—SPO #3058, 22" x 28" Table.
1—INT. JDP 1600 x 10.

Pin Lift

9—INTERNATIONAL & B & P Speed Draw Machines. Used with Sand Slinger. Capacity from 600 to 2000 lbs., up to 30" x 40" flasks.

Jolt Squeeze Pin Lift

1—MILWAUKEE #216, 21" Squeeze Cyl.
1—MILWAUKEE #125, 21" x 27" Table.
1—OSBORN #716-PJ, 22" x 34" Table.
1—OSBORN #712-V, 18" x 26" Table.
2—OSBORN #710-J, 17" x 21" Table.
4—INTERNATIONAL PKL, 17" x 26" Table.
1—SPO #2114, 20" x 27" Table.
2—SPO #2136-G, 19" x 26" Table.

MATERIAL HANDLING EQUIPMENT

1—HAYWARD 1 cu. yd. Electric Clamshell Bucket.
1—EC&M 45" dia. Type SA, Magnet.
3—HOUGH Model HA Payloader, hydraulic.
1—BLAW-KNOX ½ yd. Bucket.

CONVEYORS

Steel Apron

9—JEFFREY & LINK BELT 24", 30", 36", 42", & 48" Widths. Length built to your specifications, with reducers & motors to your speed requirements.

Oscillating

3—SIMPLICITY Model OA-10-A, 36" x 15'.
1—LINK BELT 48" x 154', 20 HP Motor.
2—KAYSING IRON WORKS, 24" x 50' x 4" depth.

Roller

2500' MATHEWS 6", 14", 22", 24", & 30" wide. Heavy duty. 2⅞" dia. roller, 1¼" hex shaft on 3" & 4" centers. Mounted above rail on 4" channel iron. Send us your requirements.

Mold

1—LINK BELT 36 cars 4' x 5', 190' track, with automatic dump. New 1952.
3—LINK BELT 88 Cars 20" x 48", 350' track, with automatic dumping.

Belt

LINK BELT & JEFFREY 18", 24", & 30" wide. Flat or trough idlers, all Timken bearings. Built to your specifications. Can be equipped with molders hoppers & ploughs.

MOLDERS HOPPERS & STORAGE BINS

7—NATIONAL & LINK BELT Storage Bins, 60 to 150 tons cap.
42—MOLDERS Hoppers 1½ ton cap. Air gates.
2—NEWAYGO Handy Sandy HS-7-GT.

SAND MULLERS

1—B & P #7 Mulbaro, 700 lb. cap.
1—B & P #30 Speedmullor.
1—B & P #70 Air Cooled.
1—BAKER PERKINS #16½, 30 HP.
1—CLEARFIELD No. 414, 4 cu. ft.
1—DRAVO-DOYLE 6 cu. ft. cap. Port.
1—LINK BELT 48" x 8' Paddle Type.
2—SIMPSON #1 Style B, 400 lb.
3—SIMPSON #3 Style C, 3000 lb.
1—SIMPSON #2 Style C, 1500 lb.
3—SIMPSON #3 Style UD, 3000 lb.
1—SIMPSON #0 Style B, 175 lb.
1—SIMPSON #1½ Style C, 700 lb.

SAND PREPARATORS

2—NATIONAL #3 Style C Aerators.
6—ROYER Complete conditioning units including Shakeout, Belt Conveyor and Sand Blender.
6—B & P Screenerators, Models S, M & L.
1—PEKAY Aerator, Model 320-3.
8—ROYER, Models, NDP, C-2, NC-4, NDS.
6—AMERICAN Sand Cutters, Model M, Sizes 79/60, 89/70, 99/80. All late models.
4—AMERICAN Model AA and AM, 45" & 60" Cutting Blade.

SANDSLINGERS

2—B & P Tractor Type 19" head & 16" head, 13' arms. Magnetic towers.
6—B & P Model DE Stationary Sand Slinger, 16", 19" and 22" heads, with 20, 25, 40 and 50 HP motors. All late models.
2—B & P Swing Type Slingers 19" head.
1—B & P 2 ton plate feeder.
4—B & P 8 ton plate feeders.

SHAKEOUTS & SCREENS

1—SIMPLICITY 3' x 5' Model B, 5000#.
1—SIMPLICITY 3' x 8' Model BG, 5000#.
1—ROBBINS 8' x 10' Model JF-11 Dual, 10 tons per unit.
1—ROBBINS 3' x 5' portable
1—SIMPLICITY 4' x 10', Model D.
1—SIMPLICITY 6' x 8', Model DE.
1—SIMPLICITY 5' x 8', Model D.
1—NATIONAL ENG. 5' x 8' Hex Screen.
1—HEWITT-ROBINS 36" x 78" Vibrex.
1—SIMPLICITY 4' x 10' Model B, single deck sifter screen, 10 HP motors.

SAND BLAST EQUIPMENT

1—AMERICAN #3 Tablast, 4—48" tables.
1—AMERICAN #1 Tablast, 7—14" tables.
1—AMERICAN 27" x 36" Skip Hoist only
2—AMERICAN 36" x 42", w/Skip Hoist.
2—AMERICAN 48" x 42", w/Skip Hoist.
1—PANGBORN 9LF-14—9' dia. Plain Table w/two Roto-Blast units and CH-2 Dust Collector, 4850 CFM. New 1951.

TUMBLING BARRELS

13—SLY & WHITING. All late type units, with gearhead motors and built in magnetic brake, Timken bearings. Following sizes 30" x 60", 36" x 54", 36" x 84", 42" x 72", 48" x 72", 48" x 96", 72" x 120". Send for detailed specifications.

AAA MACHINERY & EQUIPMENT CO.

15539 SARANAC ROAD—CLEVELAND 10, OHIO—CALL LI. 1-6545

THE ACME BARGAIN PAGE

BLOWERS
Ingersoll-Rand Type FS. Single Stage 4000 CFM @ 3.75 PSI, 100 HP, 220V G. E. Induction motor.
General Electric 7500 CFM, 20 oz., 89.6 Max. HP, 220V motor, Airway controls.
Ingersoll-Rand turbo compressor 10500 CFM @ 20 oz. 85 HP G. E. 220V 3500 CFM motor.
1—Whiting-Allis Chalmers Turbo. 5750 CFM 28 oz. 60 HP 440V air pressure.

CONVEYORS, VIBRATING
36″ x 162′ Oscillating Pan Link Belt
30″ x 53′ Oscillating Pan Link Belt

CORE BLOWERS
3—International SB 12.
4—International SB 13.
10—Osborn 193.
1—Osborn 2035-2.
1—Champion CB 400.
2—CB 10 Late Type.
1—3E Demmler Drop Away Draw.
1—No. 4 Demmler.
1—Redford Bench Type.

CORE GRINDERS
3—Milwaukee 70-9.

CORE OVENS
Despatch Type S, 2 cars 27½ x 54 x 64, Gas Fired.
Despatch recirculating gas 60″ x 54″ x 64″.
2—Thermonic 900A-1800A.

CORE OVEN VERTICAL HORIZONTAL
1—Coleman, combination oil or gas fired 43 carriers 24″ x 90″—1 hour 12 min. to 4 hours 48 min. cycle.
1—Coleman, combination oil or gas fired 43—2 shelf carriers 30″ x 144″ long. 2 hour 12 min. to 7 hour 24 min. cycle. Present replacement cost over $90,000.

CORE PASTE OVENS
2—Coleman Gas Fired 28′-25″ x 42″ opening.

DUST COLLECTORS
Rotoclone 24W, 30 HP.

ELECTRIC MELTING FURNACES
Detroit Electric 1500#—Kuhlman 13200 volt transformer complete with controls.
Detroit Electric 350#—Kuhlman 13200 volt transformer and controls.
Detroit 350#-750# shells 2300V Primary, Complete with controls.

FURNACE TRANSFORMERS
We have Electric Furnace Transformers in stock from 800 KVA to 2500 KVA. Write us your needs.

FURNACES, ALUMINUM-BRASS
Stroman 1000# hydraulic Tilt-oil.
Stroman 300-400# hand tilt oil-gas.
Eclipse 100# RB stationary gas.
Stroman 350#.
Fisher 1000# BBI Manual Nose Pour.
Lindberg 500# ASM 600.

GRINDERS, SNAGGING
2—Hammond 10 WRI D. E. Snag. 20″ dia. wheels. 10 HP 220/440 v motors, variable speed drives.
1—3″ x 24″ U.S. #65, 20 HP 220/440V.
1—7½ HP Hammond D. E. Snag Grinder.

GRINDERS, SWING FRAME
1—3″ x 24″ x 12″ Marschke, 20 HP.
1—3″x24″x12″ U.S. 15 HP.

HOT METAL CARRIERS
3—1 ton D.C. Cab operated Cleveland, Monotractor Hot Metal Carriers.

LADLES
2000# Whiting Jr. & Car.
5000# Modern Geared.

MOLDING MACHINES
Jolt Squeezers:
5—Milwaukee 103-11 Staty. Jolt Squeezers, 13½″ x 20″ table.
7—Champion JS10P Portable Jolt Squeeze molding machine, 18″ x 21″ table.
1—Osborn 275J.
1—Taccone Model TD4, high production jolt squeeze.
Jolt Squeeze Pin Lifts
1—#165 Milwaukee.
10—712 PJ Osborn, 18″ x 28″ table.

ROLLOVERS
1—Herman 4000# Series 30″ x 60″ table.
1—Herman 3000# Series 40″ x 84″ table, special slotted table.
1—Herman 1500# Series 20″ x 36″ table.
2—Herman 750# Series 20″ x 30″ table.
2—Herman 750# Series 20″ x 24″ table.
3—Spo Model 9032.
1—Milwaukee 217, 22″ x 42″ table.
2—International Type G, Portable, 20″ x 8″ draw.
3—Tabor Portable Rollover 30″.
Johnston & Jennings 1020-44 x 44 max. Flask Size.
Osborn #405 20″ x 60″ table.

PIN LIFT PUSHOFFS
1—Champion Pin Pushoffs 28″ x 42″ table 10″ draw.
Milwaukee 620 ND-20″ x 24″ table.

MULLERS
Simpson 1 H
Simpson #2 Unit drive
#70 B & P modern cross head, rebuilt.

OVERHEAD TROLLEY CONVEYORS
5000′ Jervis B. Webb & Link Belt 678 chain, 4 D.C. motor drive and MG set.

POURING DEVICES
3—Pouring devices, Whiting 500#.

SAND CONVEYORS
144′-30″ Flat with Drives.
47′-30″ Trough with Drives.

SHAKEOUTS
Link Belt 5′ x 10′—7½ HP motor

TUMBLING BARRELS
3—Royersford 42′ x 72′ Roller Bearing, Chain Drive.
1—Sly Square 42 x 42 x 64.
1—Sly 42″ Dia. x 56″.

WIRE STRAIGHTENERS
Climax 2A
Lewis 7C 1/16″ to 3/16″ with cutoff.

WHEELABRATORS
48″ x 42″ American, bucket loader

ACME

ACME EQUIPMENT CO., INC.

We will buy for cash a single piece of equipment or your entire plant

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MONA

UNIVERSAL REBUILT EQUIPMENT GUARANTEED

AIR COMPRESSORS

COMPLETE STOCK—BURY, PENNSYLVANIA, SULLIVAN, INGERSOLL-RAND —SEND YOUR REQUIREMENTS

BLOWERS

25—CENTRIFUGAL, 16 oz., 2 to 5 HP
10—GE, WILBRAHAM-GREEN, FISHER Positive Pressure and Cent. Cupola Blowers

CLEANING EQUIPMENT & TUMBLING BARRELS

1—AMERICAN WHEELABRATOR TUMBLAST, 48" x 48" w/loader used 9 Mos.
1—AMERICAN WHEELABRATOR TUMBLAST, 42" x 48" w/loader
1—AMERICAN WHEELABRATOR TUMBLAST 36" x 42" w/loader
1—AMERICAN WHEELABRATOR TUMBLAST, 27" x 36" w/loader
1—AMERICAN WHEELABRATOR, 36", Continuous Side Discharge, Two Head, Serial #A95643, New 1953, Used 2 Months
1—PANGBORN TABLAST, 8' Table
1—PANGBORN ROTOBLAST, #28, Type GK
1—PANGBORN BLAST CABINET, #EP-5
3—TANNEWITZ METAL CUTTING BANDSAWS, 30" and 36"
1—CRESCENT METAL CUTTING BANDSAW, 30"
4—BURRING BENCHES, Magnesium cleaning. 9' L x 30" H x 30" W
1—AMERICAN #1 MULTITABLE TABLAST, 17" Table
1—36" Continuous AMERICAN TUMBLAST, 15 tons per hour capacity
1—15" Continuous AMERICAN TUMBLAST, 4 tons per hour capacity
10—WHITING 36" x 36" x 72" w/gear head motors & brakes
1—WHITING 36" x 72" Round w/gear head motors & brakes
1—WHITING 24" x 72" Round w/gear head motors & brakes

CONVEYORS

1—LINK BELT, vibrating, double deck, 80' x 24", w/exhaust hood
1—LINK BELT, Car type mold, 114 cars, 403' track. car size 18" x 42"
2—LINK BELT, 30" Steel Apron Conveyors, 100' Centers
1—JEFFREY, 3 compartment, ingot mold
4—SAND ELEVATORS, Various sizes
6—SAND BELTS, 10' ctrs. to 140' ctrs.
2500 FEET—FOUNDRY TYPE ROLLER CONVEYOR—ALL SIZES

CORE BLOWERS

1—CHAMPION CB-12
1—INTERNATIONAL SB-13
1—OSBORN Core Rollover, #136-3, (NEVER USED)
6—DEMMLER #2, #2A, #2K, #3K, #55
3—OSBORN #92, #192, #193

CUPOLAS

1—MORRIS #9, Skip charger, Blower, Mixing Ladle, Never Installed
1—SKIP CHARGER for #9 Cupola with scale and buckets
2—TABOR Cupolettes, 48" dia, 9" cap.
1—WHITING Skip Charger for #5 Cupola

DUST COLLECTORS

9—ROTOCLONE #12 Type N, #14D, #16W, #20D, Type W 30"

FLASKS

150 HINES AND FREEMAN ALUMINUM, Popoffs and Jackets
200 TRANSITE CORE PLATES, Various Sizes
SEND US YOUR REQUIREMENTS

FURNACES—DIRECT ARC MELTING

1—3,000#/hr. LECTROMELT
1—250 Lb. LECTROMELT, Side Charge
1—500 Lb. LECTROMELT, Side Charge
1—3 Ton LECTROMELT

FURNACES—INDIRECT ARC

1—350#/hr. DETROIT, Complete
1—1500# DETROIT ROCKER, Complete
1—3000# DETROIT ROCKER, Complete

FURNACES—INDUCTION MELTING

1—30 KW, LEPEL
1—20 KW, AJAX SPARK GAP, High Frequency
1—3 KW, AJAX, Lab type

MUST SELL REGARDLESS OF OUR LOSS

PANGBORN CONTINUOUS SHOT BLAST MACHINE

REPLACEMENT COST OVER $75,000.

5 Wheel Type each wheel driven by 20 Hp AC Motor. Pendulum type #458 chain conveyor for pick up and return, w/motor driven screw type conveyor for shot return to bucket elevator. Complete w/all controls and switches. Serial #180 RF-3918. Large lot of new spare parts.

FURNACES—GAS & OIL

1—FISHER MNP, Gas, Tilting, 1700# cap. Mag.
2—FISHER. Gas, Stationary, 4 Burner, 500# cap.
1—FISHER MNP, Oil, Tilting, with blower, 500# cap. Alum.
1—FISHER MNP, Oil, with blower, 1500# cap. Brass
1—HAUSFELD, Tilting, 1200# capacity
1—SKLENAR, Oil, 600# Cap.
1—STROMAN, Gas, Tilting, 1,000# cap. Alum, auto control hyd. lift
1—REDA 550#. Never Used

GRINDERS

1—GARDNER 12" x 2½" wheels, 5 HP
1—HISEY WOLF, Model 4, 16" x 2" wheels, 7½ HP
1—MODEL CLASS ONE, 18" x 3" wheel, 15 HP
3—U.S. Model 64, 14" x 2" wheels 5 HP
2—U.S. Model 66, 14" x 3" wheels, 7½ HP
1—U.S. Model 65, 20" x 3" wheels, 10 HP
2—U.S. 22" x 3" wheels, 15 HP Swing Frame
1—MUMMERT DIXON, 16" x 2" wheel, 7½ HP
4—22" wheels, 10 or 15 HP

MOLDING MACHINES

Jolt Rollover Pattern Draw

2—J & J #918, 44 x 54 Table, 20" draw.
1—J & J #815, 30" x 40", 15" draw, 1200# jolt
2—INTERNATIONAL, 13 x 17" table, 6" draw
1—HERMAN 10,000#, 48" x 109" table
1—HERMAN 6000#, 42 x 78"
1—HERMAN 3000#, 30" x 66" Table
2—HERMAN 1500#
1—HERMAN 750#, 30" x 36"
1—OSBORN #602, 36" x 28"
2—OSBORN #405-86, with leveling carriage
1—OSBORN # 405, 3.000#, flask size 64" x 50", 18" draw
4—OSBORN #42, 15" x 20", hand draw
4—TABOR, 40 x 60", 2000 & 3000# capacity
1—TABOR, 30" x 40" with air clamps
3—TABOR 22" x 42", pattern draw, shockless, portable
1—TABOR, 20 x 30" w/air clamps, 1000#
2—TABOR, 14" x 16" Rockover
1—SPO ROCKOVER #506, 24" x 25" table

Bumpers

1—OSBORN #102
3—DAVENPORT, Table sizes 24" x 27", 30" x 30"

Jolt Pin Lift

1—J & J, 30" x 24" table, 600# cap.
2—SPO #305, 20" x 27" table, 750# cap.
1—HERMAN, 22" x 30" table, #4317
1—TABOR, 17" x 20" table. portable
1—TABOR, 20" x 20" table, hand strip
1—MILWAUKEE #1536, 32" x 38"
1—INTERNATIONAL 1255 PKL
1—OSBORN #559, 25" x 30" Table, 6" draw

Jolt Squeeze Pin Lift

1—OSBORN #710, 16" x 25" table, 10" Sq.
2—OSBORN #712, 18" x 28" table, 12" Sq.
2—SPO 2136, 21" x 30", table, 13" Sq.
1—SPO #2148, 24" x 31" table, 14" Sq.
2—SPO #2160, 25" x 34" table, 16" Sq.
1—MILWAUKEE #126, 21" x 27" table, 12" Sq.
2—MILWAUKEE #163 15" x 24" table, 11" sq.

Jolt Squeezers

2—MILWAUKEE #105JS, 17 x 21", port.
4—SPO #110J, 17" x 20" table, 10" sq.
4—INTERNATIONAL #10 LJS, 17" x 20" table
2—INTERNATIONAL, #12 LJS, 17" x 20" table
6—TABOR, 3" Jolt, 17 x 20"
2—NICHOLS, #12 F-P portable
12—OSBORN #275J, #275PJ, 16" x 20" tables, 10" Sq.

MATERIAL HANDLING

1—HYSTER, Fork Lift, Gas, 7500 lb. capacity
1—BYERS, Mobile Crane, BUDA Engine, 50' Boom
1—MAGNET, 36" Lifting

MULLERS AND MIXERS

1—CLEARFIELD, #920, 9' Dia., 25-30 cu. ft.
4—BAKER PERKINS, #4A
3—SIMPSON, #0, 3' Dia. 175 lb.
1—SIMPSON #0, 3' Dia., 1½ to 1¾ cu. ft.
1—SIMPSON, #1, 4' Dia.
1—SIMPSON, #3, 8' Dia., Open Gear, with loader
1—B & P, #40 SPEEDMULLER, with loader
1—B & P, Conventional, SIMPSON type, 87½" Dia., arranged for cooling

LADLES AND POURING DEVICES

MODERN, SWINDELL, WHITING, TREADWELL—All Types and Sizes—Ready for your Needs!

OVENS

1—COLEMAN, OIL, one compartment, recirc., 60" W x 80" H x 14' 6" L
2—ROSS, Gas, 2 compartment, recirc., rack type, 6½" x 14' x 7'
1—YOUNG BROS. elec., 3 compartment, Kiln type
3—GENRICH, elec., 3 drawer, preheating, auto-control, 9' H x 8' W x 6'7" L
1—COLEMAN, Gas, 2 Comp. and 5 drawers, O.D. 22' x 12' x 10'

SAND CONDITIONING

3—B & P SCREENERATORS Model L, M and S
1—ROYER PREPARATOR, Comb. Model RC, 40 Ton/hr. Scrap removal, 9' x 9' hopper
3—ROYER, NB-2, 12" Belt
1—JEFFREY SANDITIONER, PORTABLE

UNIVERSAL MACHINERY AND EQUIPMENT CO.

1632 N. Ninth St., Reading, Pa. **Phone 3-5103**

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NOTE—If replies are to be sent to a box number in care of FOUNDRY, add 8 words to your advertisement for box number and address.

Any advertisement set in all capital letters, add 50% to the above rates.

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Single Column 2¼" Wide	One Time	Three Times	Six Times	Nine Times	Twelve Times
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3 inches	63.00	59.40	55.80	54.00	52.20
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5 inches	99.00	93.00	87.00	84.00	81.00
6 inches	115.20	108.00	100.80	97.20	93.60
7 inches	130.20	121.80	113.40	109.20	105.00
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20 inches (2 cols.)	312.00	288.00	264.00	252.00	240.00
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FOUNDRY

PENTON BUILDING • CLEVELAND 13, OHIO

LOOK to Logan

GET GREATER VERSATILITY IN YOUR POWER OPERATIONS

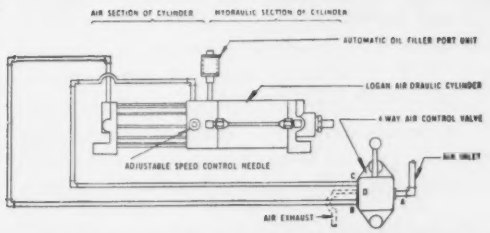
. . . SPEED PRODUCTION

. . . CUT COSTS

Logan Air-Draulic cylinders and circuit components offer a complete package unit to meet a wide range of operations. Logan Air-Draulic cylinders combine the fast-acting, economical low-pressure operation of air with the smooth, uniform controlled regulation of oil.

MEMBER: Natl. Mach. Tool Builders' Assn.; Natl. Fluid Power Assn.

SEND FOR FREE "LOGAN CALCULATOR"

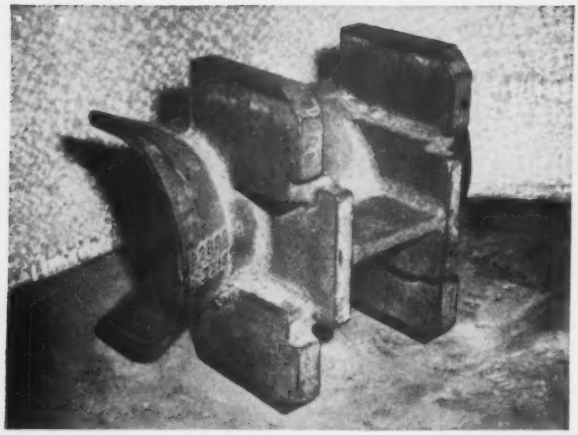


LOGANSPORT MACHINE CO., INC.
850 CENTER AVENUE, LOGANSPORT, INDIANA

PLEASE SEND COPY OF CATALOG:

☐ Facts of Life
☐ 100-1 Air Cyls.
☐ 100-2 Mill-Type Air Cylinders
☐ 100-3 Air-Draulic Cylinders
☐ 100-4 Air Valves
☐ 100-5 Logan-square Cyls.
☐ 100-5-1 Ultra-mation Cyls.
☐ 51 Presses
☐ 62 Sure-Flow Pumps
☐ 200-1 Hyd. Power Units
☐ 200-2 Rotocast Hyd. Cyls.
☐ 200-3 750 Series Hyd. Cyls.
☐ 200-4 and 200-7 Hyd. Valves
☐ 200-6 Super-Matic Cyls.
☐ 70-1 Chucks
☐ ABC Booklet
☐ Circuit Rider

TO:
NAME_____ TITLE_____
COMPANY_____
ADDRESS_____



Half a pipe guide barrel for a tube mill—perfect, but ¼-inch too short on each of the four projections . . .

would you scrap this casting?

You *wouldn't* if you thought of Ni-Rod* electrode.

A mistake in the pattern — and a 300-lb. casting was 1/2″ too narrow in total width.

Almost ready for the scrap heap! But nine lbs. of Ni-Rod electrode saved it — saved the foundry $150.

First, the short projections were ground down. Then three layers of Ni-Rod electrode were laid on — *with no preheat required.*

The final step: easy machining to the correct over-all width of 22″ plus 0.000″, minus 0.032″.

When you repair defective castings with Ni-Rod electrode, you get sound, machinable welds easily. Ni-Rod electrode has another important advantage: *welds match the color of the cast metal closely.*

Ni-Rod and Ni-Rod "55"* electrodes (for heavier sections) simplify repairs, make cast iron welding easier. You can order them from your supplier in 5-lb. containers — 3/32-, 1/8-, 5/32-, and 3/16-inch diameters.

Do it today. And write for your copy of "Repair Cast Iron Parts Quickly and Easily." This folder shows many ways others are saving money by salvaging and repairing cast iron with Ni-Rod and Ni-Rod "55" electrodes.

*Registered trademark

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street — New York 5, N.Y.

INCO TRADE MARK

Welding Products
Electrodes • Wires • Fluxes

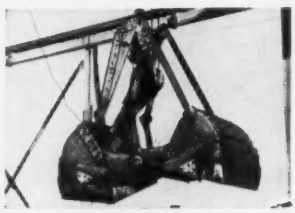
• HANDLE COKE WITH MINIMUM DEGRADATION • HANDLE SAND WITHOUT LEAKAGE

with the same BLAW-KNOX DUAL-PURPOSE FOUNDRY BUCKET

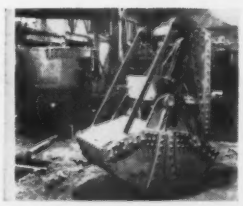
BLAW-KNOX "Shark Tooth" Single-Line Hook-On Buckets cut the cost of rehandling coke, coal, sand, and small limestone because one bucket, with easily attached or removable liner plates, is all you need. With the plates attached, fine granular materials are handled without leakage. Without the liner plates, the "shark teeth" literally finger their way through the coke, so it may be handled with minimum degradation. Hook-On feature permits quick detaching for change to magnet.

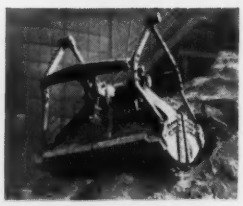
Above — Rated 1-cu. yd. closed head type Blaw-Knox "Shark-Tooth" Bucket, without liner plates, reeved 2-parts for 13'6" headroom. Range of sizes for every requirements.

Right — This open head type Blaw-Knox Bucket, rated 1-cu. yd., is equipped with liner plates for rehandling sand, coal, limestone, etc. Shown reeved 2-parts for 8'9" headroom. Choice of sizes.



BLAW-KNOX BUCKETS
help solve average or unusual conditions





FOR AVERAGE HEADROOM— **There's a type and size of Blaw-Knox Single-Line Hook-On Foundry Buckets to meet a wide range of operating conditions. Take advantage of the Blaw-Knox engineering service available without obligation to help you select the bucket best suited to your needs.**

FOR LOW HEADROOM **— This Blaw-Knox Single-Line Hook-On Bucket solves rehandling problems when headroom is extremely limited. The ¾-yd. capacity bucket requires only 6'7" operating headroom. Also available in larger sizes.**

Write for Bulletin 2232 today.

BLAW-KNOX COMPANY
PITTSBURGH 38, PA.
Offices in Principal Cities

BLAW-KNOX FOUNDRY BUCKETS
BLAW-KNOX
THE MOST COMPLETE RANGE OF SIZES AND TYPES

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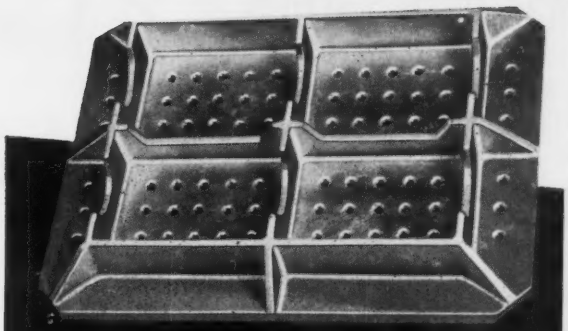
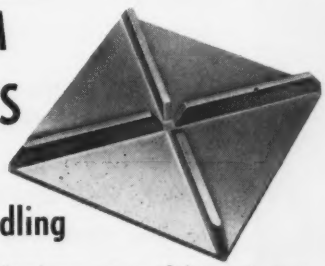


ALUMINUM BOTTOM BOARDS

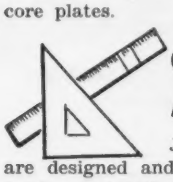
give Infinite Life—Uniform Molds

JO-EL aluminum bottom boards have *infinite* life—assure uniform molds each cast. They eliminate the ever-increasing cost of labor and materials in making and continually replacing short-lived old-fashioned wooden boards that produce castings of questionable quality. Designed by practical foundrymen for better results and easier operation, they are cast of aluminum for light weight combined with maximum durability. Vent holes on face permit gas escapement. Will not warp or burn, are not affected by weather. Optional raised sand strip around outer edge peens each mold uniformly and eliminates sand slippage. Rib reinforcement assures added strength and durability. Stacking problems are eliminated. When you use JO-EL aluminum bottom boards, you eliminate a major source of foundry headaches and substantially reduce costs.

ALUMINUM CORE PLATES for Lightweight Handling



JO-EL light-weight aluminum core plates cut two man operations to one man. Exclusive design permits circulation below plate for much faster conduction than steel. They cut baking cycle time substantially, making possible increased casting production. Distribution of heat is more even, for a better finished product. You eliminate *all* core plate problems when you use JO-EL light-weight aluminum core plates.



COMPLETE JO-EL ENGINEERING AND MANUFACTURING SERVICES

JO-EL bottom boards and core plates are designed and built to your specifications. Just send us a rough sketch and dimensions of the bottom boards and core plates you need, plus an indication of the quantity of each desired, and we'll provide a prompt quotation. For manpower and material saving, money-making aluminum, bottom boards and core plates, write, wire or call:

JO-EL COMPANY

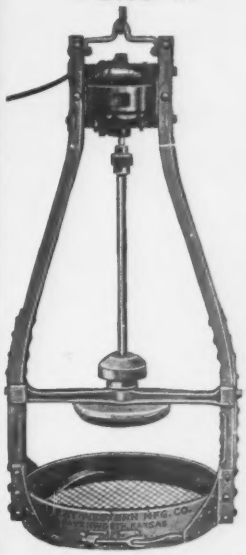
Town & Country Building, 6188 Pearl Rd. Cleveland 30, Ohio
Phone: TUxedo 6-0434

Circle 775 on Inquiry Card—Page 225

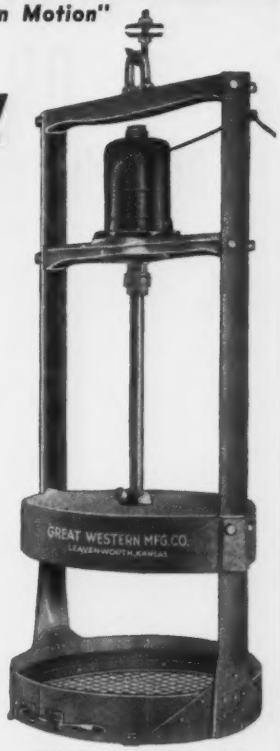
"The Greatest Name in Motion"

COMBS GYRATORY RIDDLES

"Built To Take It"



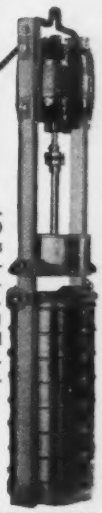
TYPE "V". Price 20" Sieve, $275.00. Does the work of 10 men. Screens sand, Fine, Medium, and Coarse. 20" dia. sieve with special clamp for 5-second changes. 4'6" high, weight 100 lbs., fully-enclosed 1/6 H.P. motor. Also available in Giant V-5 with 36" sieve for triple capacity . . . Price $495.00.



TYPE "CR". Complete price $350.00. 24" dia. round sieve. Sifts, fluffs, mixes, aerates sand. Height 4'6", weight 250 lbs., ⅓ H.P. enclosed motor.

PROMPT DELIVERY from your Foundry Supply House

TYPE "CS". Complete price $360.00. 24" square sieve. A continuous operation sieve. Requires no dumping, as refuse is ejected off to one side. Height 4'10", weight 295 lbs., ⅓ H.P. enclosed motor.



TYPE "HL". Price $250.00 complete, less sieves. Laboratory model especially designed for sand control fitted with 1/6 H.P. enclosed motor.

MAIL THE COUPON NOW!

GREAT WESTERN MFG. CO.

Leavenworth, Kansas **Phone MU-22291**

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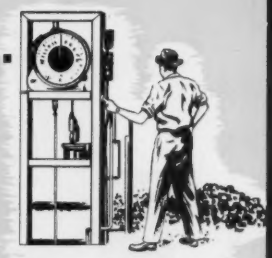
Circle 776 on Inquiry Card—Page 225

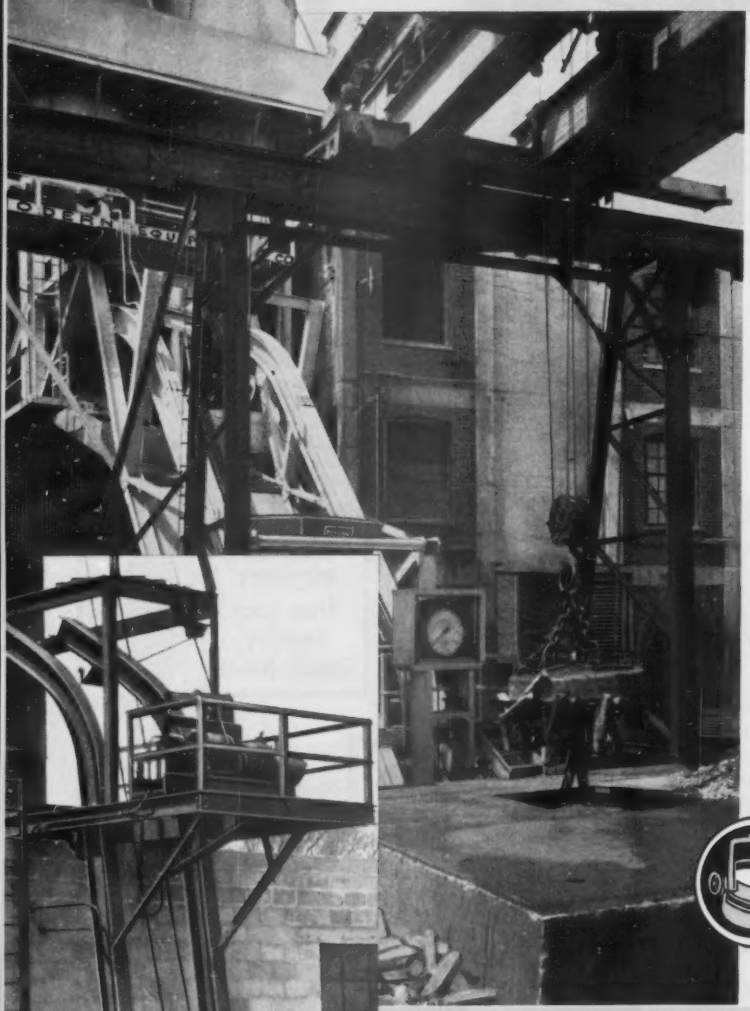
CHARGE-MAKE-UP MEN may push buttons . . .

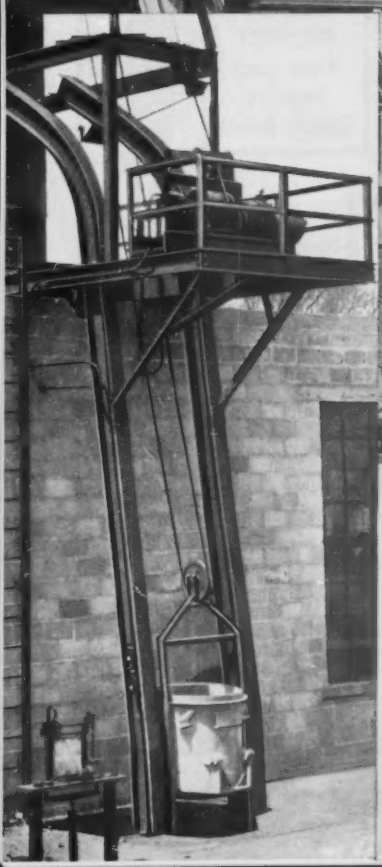
OR, push wheelbarrows . . .

BUT the results are different!



There are marked differences in charging costs! Differences in control and supervision! Differences, too, in the quality of metal cast!





Through MODERN, push-button charging a finger-tip control is placed within easy reach of one operator. He is responsible for selecting, weighing and placing the charge in the cupola. With this uniform and accurately controlled charge, going into the cupola, there is taken out a uniform quality of metal. This improved quality of metal, alone, has been known to defray the investment in mechanical charging. Plus values are the savings in man power and improved over-all safety.

SO whether you are planning to invest $6,000 or $60,000 in your profit-boosting, mechanical charging system we invite you to figure with MODERN engineers — the men who developed the original, inclined, skip type charger. For additional planning data ask for new bulletin S-147-B. The coupon will reserve a copy for you . . .

MODERN

MODERN EQUIPMENT COMPANY
Port Washington, Wisconsin

Since designing the first, inclined, skip type charger MODERN engineers have worked together with practical foundrymen in the development of hundreds of charging systems for foundries large and small.

Circle 777 on Inquiry Card

MODERN EQUIPMENT COMPANY, DEPT. F-3
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New bulletin on SMALL-CONE charging, 147-C ☐
Catalog on metal pouring systems and small ladles, P-152-A ☐
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SUPER RESULTS IN YOUR FOUNDRY

- A powdered zircon core and mold coating.
- Has a fusion point of over 4000° Fahrenheit.
- Withstands the highest temperatures.
- Its white color means easy visual checking of coating thickness and ease in setting cores in molds.
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- 100% solids — you are not buying water.
- At normal consistencies it stays in suspension indefinitely.

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STEVENS 75 YEARS OF SERVICE

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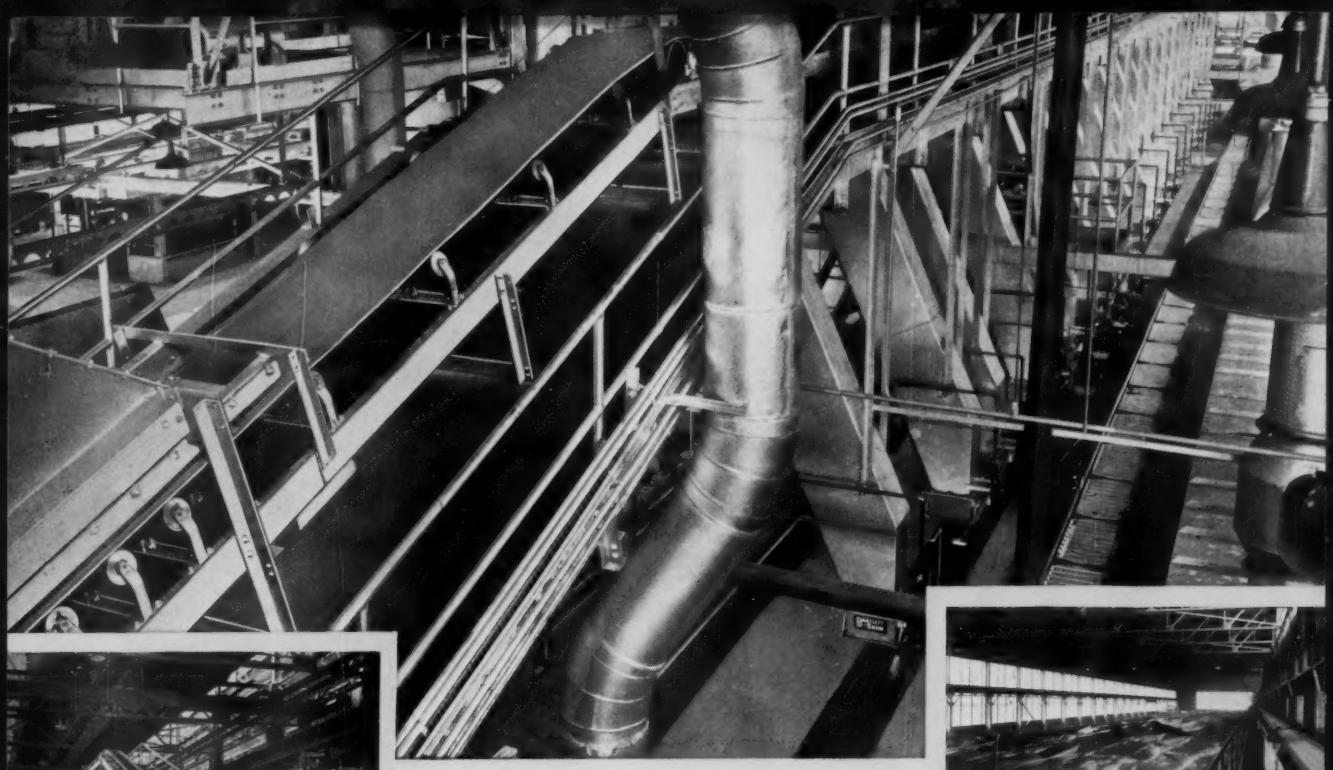
EVERYTHING FOR A FOUNDRY

Circle 552 on Inquiry Card—Page 225



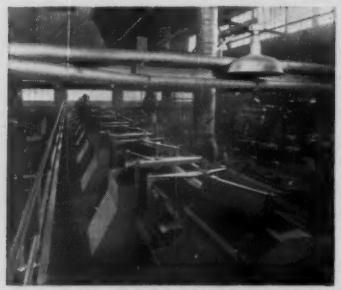
Above; View of Prepared Sand Handling and Distributing System in Large Automotive Foundry.

Above; View in Large Implement Foundry Showing Distributing System, Molders Hoppers and Mold Conveyor; At Right: Distributing Dried and Cooled New Sand to Bulk Storage Bin.

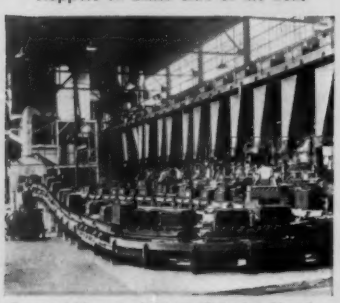
new prepared core shakeout and waste

Sand Handling SYSTEMS

including controlled screening, cooling, aeration and mulling;— assure unvarying uniformity day after day;— more molds per day with less effort; — better castings with less scrap; — and increased output per man and square foot of floor area.



Prepared Sand Distributing Belt Showing Adjustable Plows that Discharge Sand to Hoppers on Either Side of the Belt.



General View in Jobbing Foundry Showing Sand Distributing System, Molders Hoppers and Self Dumping Car Type Mold Conveyor.

● Complete systems engineered to meet your individual requirements. Coordinated sand handling, molding, core setting, pouring, cooling, shakeout and reclaim equipment. A ***vital*** necessity for ***every*** size and every type of foundry. Let us help reduce your costs by modernizing your foundry operations!

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